KENYA CIVIL AVIATION AUTHORITY

TENDER DOCUMENT

FOR

SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF AN AIR TRAFFIC MANAGEMENT SYSTEM AT JOMO KENYATTA INTERNATIONAL AIRPORT.

TENDER NO. KCAA/008/2019-2020

DATE OF NOTICE: TUESDAY, 4TH FEBRUARY 2020

CLOSING DATE: THURSDAY, 5TH MARCH 2020 AT 1100 HOURS.

BIDDERS TO NOTE:-

- *All bidders must note that KCAA communicates only in writing to all interested bidders during the entire tendering process.*
- *A mandatory pre-bid meeting will be held on Wednesday, 19th February, 2020 at 11:00am at KCAA Headquarters - Aviation House.*

TABLE OF CONTENTS

Contents

Introduction

Kenya Civil Aviation Authority herein referred to as KCAA wishes to invite bids for the **Supply, Delivery, Installation and Commissioning of An Air Traffic Management System at Jomo Kenyatta International Airport**.

SECTION I – INVITATION TO TENDER
DATE OF NOTICE: 04/02/2020

TENDER REF NO.KCAA/008/2019-2020

TENDER NAME: TENDER FOR SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF AN AIR TRAFFIC MANAGEMENT SYSTEM AT JOMO KENYATTA INTERNATIONAL AIRPORT.

1.1 The Kenya Civil Aviation Authority now invites bids from eligible firms for the **Supply, Delivery, Installation and Commissioning of an Air Traffic Management System at Jomo Kenyatta International Airport.**

1.2 Interested eligible candidates may obtain further information from and inspect the tender documents at KCAA Procurement Office on ground floor, Aviation House Building, Jomo Kenyatta International Airport during normal office working hours (8.00am-1.00pm, 2.00pm – 5.00pm). Bidders may also view and download the bidding document from KCAA website: **www.kcaa.or.ke** or **www.tenders.go.ke** and immediately forward their particulars for records and for the purposes of receiving any further tender clarifications and/or addendums to **procurement@kcaa.or.ke**.

1.3 A complete set of tender documents may be obtained by interested candidates upon payment of a non-refundable fee of One thousand Kenya shillings (Ksh 1,000.00) in cash or bankers cheque payable to Director General, Kenya Civil Aviation Authority. Bidders who download the tender document will not be required to pay.

1.4 Prices quoted should be net inclusive of all taxes and delivery costs, must be expressed in Kenya shillings or one major easily convertible foreign currency and shall remain valid for a period of 120 days from the Closing date of the tender.

1.5 A mandatory pre-bid meeting will be held on **Wednesday, 19th February 2020 at 1100** hours at **KCAA headquarters in Aviation House, Jomo Kenyatta International Airport, Nairobi**.

1.6 Completed tender documents are to be enclosed in plain sealed envelopes marked with tender reference number and be deposited in the Tender Box at **Ground floor, Aviation House, Jomo Kenyatta International Airport** or be addressed to:

The Director General,
Kenya Civil Aviation Authority,
P.O Box 30163-00100, Nairobi
so as to be received on or before **Thursday, 05/03/2020 at 1100 hours.**

1.7 Tenders will be opened immediately thereafter in the presence of the Candidates or their representatives who choose to attend at **KCAA Auditorium on Ground Floor, Aviation House, JKIA, Nairobi.**

MANAGER PROCUREMENT
For: <u>DIRECTOR GENERAL</u>

SECTION II – INSTRUCTIONS TO TENDERERS

TABLE OF CONTENTS **Page**

Contents

SECTION II - INSTRUCTIONS TO TENDERERS

2.1 Eligible Tenderers

2.1.1 This Invitation for Tenders is open to all tenderers eligible as described in the Appendix to Instructions to Tenderers. Successful tenderers shall complete the supply, install and commissioning of the equipment by the intended completion date specified in the tender documents.

2.1.2 The procuring entity's employees, committee members, board members and their relative (spouse and children) are not eligible to participate in the tender unless where specially allowed under section 131 of the Act.

2.1.3 Tenderers shall provide the qualification information statement that the tenderer (including all members of a joint venture and subcontractors) is not associated, or have been associated in the past, directly or indirectly, with a firm or any of its affiliates which have been engaged by the Procuring entity to provide consulting services for the preparation of the design, specifications, and other documents to be used for the procurement of the goods under this Invitation for tenders.

2.1.4 Tenderers involved in corrupt or fraudulent practices or debarred from participating in public procurement shall not be eligible.

2.2 Eligible Equipment

2.2.1 All equipment to be supplied and installed under the contract shall have their origin in eligible source countries.

2.2.2 For purposes of this clause, "origin" means the place where the equipment(s) are produced. Goods are produced when, through manufacturing, processing, or substantial and major assembly of components, a commercially-recognized product results that is substantially different in basic characteristics or in purpose or utility from its components

2.2.3 The origin of equipment is distinct from the nationality of the tenderer and shall be treated thus in the evaluation of the tender.

2.3 Cost of Tendering

2.3.1 The Tenderer shall bear all costs associated with the preparation and submission of its tender, and the procuring entity, will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the tendering process.

2.3.2 The price to be charged for the tender document shall not exceed Ksh.1000.00

2.3.3 The procuring entity shall allow the tenderer to review the tender document free of charge before purchase.

2.4. Contents of Tender Document

2.4.1 The tender document comprises the documents listed below and addenda issued in accordance with clause 2.6 of these instructions to tenderers
(i)   Invitation to Tender
(ii)   Instructions to Tenderers
(iii)   General Conditions of Contract
(iv)   Special Conditions of Contract
(v)   Schedule of requirements
(vi)   Technical Specifications
(vii)   Tender Form and Price Schedules
(viii) Tender Security Form
(ix)   Contract Form
(x)   Performance Security Form
(xi)   Bank Guarantee for Advance Payment Form
(xii)   Manufacturer's Authorization Form
(xiii) Confidential Business Questionnaire Form
(xiv)   Declaration form
(xv)   Request for Review Form

2.4.2 The Tenderer is expected to examine all instructions, forms, terms, and specifications in the tender documents. Failure to furnish all information required by the tender documents or to submit a tender not substantially responsive to the tender documents in every respect will be at the tenderers risk and may result in the rejection of its tender.

2.5   Clarification of Tender Documents

2.5.1 A prospective tenderer making inquiries of the tender documents may notify the Procuring entity in writing or by post at the entity's address indicated in the invitation for tenders. The Procuring entity will respond in writing to any request for clarification of the tender documents, which it receives not later than seven (7) days prior to the deadline for the submission of tenders, prescribed by the procuring entity. Written copies of the Procuring entities response (including an explanation of the query but without identifying the source of inquiry) will be sent to all prospective tenderers that have received the tender document.

2.5.2 The procuring entity shall reply to any clarifications sought by the tenderer within 3 days of receiving the request to enable the tenderer to make timely submission of its tender.

2.6   Amendment of Tender Documents

2.6.1 At any time prior to the deadline for submission of tender, the procuring entity, for any reason, whether at its own initiative or in response to a clarification requested by a prospective tenderer, may modify the tender documents by issuing an addendum.

2.6.2   All prospective tenderers that have obtained the tender documents will be notified of the amendment in writing or by post and will be binding on them.

2.6.3   In order to allow prospective tenderers reasonable time in which to take the amendment into account in preparing their tenders, the Procuring entity, at its discretion, may extend the deadline for the submission of tenders.

2.7   Language of Tender

2.7.1   The tender prepared by the tenderer, as well as all correspondence and documents relating to the tender exchange by the tenderer and the Procuring entity, shall be written in English language, provided that any printed literature furnished by the tenderer may be written in another language provided they are accompanied by an accurate English translation of the relevant passages in which case, for purposes of interpretation of the tender, the English translation shall govern.

2.8   Documents Comprising the Tender

2.8.1   The tender prepared by the tenderers shall comprise the following components.
  (a)   a Tender Form and a Price Schedule completed in accordance with paragraph 2.9, 2.10 and 2.11 below
  (b)   documentary evidence established in accordance with paragraph 2.12 that the tenderer is eligible to tender and is qualified to perform the contract if its tender is accepted;
  (c)   documentary evidence established in accordance with paragraph 2.13 that the goods and ancillary services to be supplied by the tenderer are eligible goods and services and conform to the tender documents; and
  (d)   tender security furnished in accordance with paragraph 2.14
  (e)   Confidential Business Questionnaire

2.9   Tender Form

2.9.1   The tenderer shall complete the Form of Tender and the appropriate Price Schedule furnished in the tender documents, indicating the equipment to be supplied, installed and commissioned and a brief description of the equipment, their country of origin, quantity, and prices.

2.10   Tender Prices

2.10.1   The tenderer shall indicate on the appropriate Price Schedule the unit prices where applicable and total tender price of the equipment and installation it proposes to supply under the contract.

2.10.2   Prices indicated on the Price Schedule shall be entered separately in the following manner:

(i)   the price of the equipment quoted EXW (ex works, ex factory, ex warehouse, ex showroom, or off-the-shelf, as applicable), including all customs duties and sales and other taxes already paid or payable:

(ii)   charges for inland transportation, insurance, and other local costs incidental to delivery of the goods to their final destination; and

(iii) installation charges shall also be indicated separately for each equipment

2.10.3 Prices quoted by the tender shall remain fixed during the Tender's performance of the contract. A tender submitted with an adjustable price quotation will be treated as non-responsive and will be rejected, pursuant to paragraph 2.22 unless otherwise agreed by the parties.

2.11 Tender Currencies

2.11.1 Prices shall be quoted in the following currencies:

(a)   For equipment that the tenderer will supply from within Kenya, the prices shall be quoted in Kenya Shillings; and

(b)   For equipment that the tenderer will supply from outside Kenya, the prices may be quoted in US Dollars or in another freely convertible currency.

(c)   Cost of installation and commissioning will be in Kenya Shillings.

2.12 Tenderers Eligibility and Qualifications

2.12.1 Pursuant to paragraph 2.2 the tenderers shall furnish, as part of its tender, documents establishing the tenderers eligibility to tender and its qualifications to perform the contract if its tender is accepted.

2.12.1 The documentary evidence of the tenderers eligibility to tender shall establish to the Procuring entity's satisfaction that the tenderer, at the time of submission of its tender, is from an eligible source country as defined under paragraph 2.2

2.12.2 The documentary evidence of the tenderers qualifications to perform the contract if its tender is accepted shall establish to the Procuring entity's satisfaction;

(a)   that, in the case of a tenderer offering to supply equipment under the contract which the tenderer did not manufacture or otherwise produce, the tenderer has been duly authorized by the equipment, Manufacturer or producer to supply the equipment

(b)   that the tenderer has the financial, technical, and production capability necessary to perform the contract;

(c)   that, in the case of a tenderer not doing business within Kenya, the tenderer is or will be (if awarded the contract) represented by an Agent in Kenya equipped, and able to carry out the Tenderer's maintenance, repair, and spare parts-stocking obligations prescribed in the Conditions of Contract and/or Technical Specifications.

2.13. Goods Eligibility and Conformity to Tender Document

2.13.1 Pursuant paragraph 2.2 of this section, the tenderer shall furnish, as part of its tender documents establishing the eligibility and conformity to the tender documents of all equipment which the tenderer proposes to supply under the contract

2.13.2 The documentary evidence of the eligibility of the goods shall consist of statement in the Price Schedule of the country of origin of the goods and services offered which shall be confirmed by a certificate of origin issued at the time of shipment.

2.13.3 The documentary evidence of conformity of the equipment to the tender documents may be in the form of literature, drawings, and data, and shall consist of:
a) a detailed description of the essential technical and performance characteristic of the equipment
b) a list giving full particulars, including available source and current prices of spare parts, special tools, etc., necessary for the proper and continuing functioning of the equipment for a period of two (2) years, following commencement of the use of the equipment by the Procuring entity; and
c) a clause-by-clause commentary on the Procuring entity's Technical Specifications demonstrating substantial responsiveness of the goods and service to those specifications, or a statement of deviations and exceptions to the provisions of the Technical Specifications.

2.13.4 For purposes of the commentary to be furnished pursuant to paragraph 2.13.3(c) above, the tenderer shall note that standards for workmanship, material, and equipment, as well as references to brand names or catalogue numbers designated by the Procurement entity in its Technical Specifications, are intended to be descriptive only and not restrictive. The tenderer may substitute alternative standards, brand names, and/or catalogue numbers in its tender, provided that it demonstrates to the Procurement entity's satisfaction that the substitutions ensure substantial equivalence to those designated in the Technical Specifications.

2.14 Tender Security

2.14.1 The tenderer shall furnish, as part of its tender, a tender security for the amount and form specified in the Appendix to Instructions to Tenderers.

2.14.2 The tender security shall be in the amount not exceeding 2 percent of the tender price.

2.14.3 The tender security is required to protect the Procuring entity against the risk of Tenderer's conduct which would warrant the security's forfeiture, pursuant to paragraph 2.14.7

2.14.4 The tender security shall be denominated in Kenya Shillings or in another freely convertible currency, and shall be in the form of
   a) Cash
   b) A bank guarantee
   c) Such insurance guarantee approved by the Authority
   d) Letter of credit.

2.14.5 Any tender not secured in accordance with paragraph 2.14.1 and 2.14.3 will be rejected by the Procuring entity as non-responsive, pursuant to paragraph 2.22

2.14.6 Unsuccessful Tenderer's tender security will be discharged or returned as promptly as possible, but not later than thirty (30) days after the expiration of the period of tender validity prescribed by the Procuring entity.

2.14.7 The successful Tenderer's tender security will be discharged upon the tenderer signing the contract, pursuant to paragraph 2.27 and furnishing the performance security, pursuant to paragraph 2.28

2.14.8 The tender security may be forfeited:

   a) if a tenderer withdraws its tender during the period of tender validity specified by the procuring entity on the Tender Form; or
   b) in the case of a successful tenderer, if the tenderer fails:

      i) to sign the contract in accordance with paragraph 2.27.1 or

      ii) to furnish performance security in accordance with paragraph 2.28

   c) If the tenderer rejects correction of an arithmetic error in the tender.

2.15 Validity of Tenders

2.15.1 Tenderers shall remain valid for 60 days or as specified in the tender documents after date of tender opening prescribed by the Procuring entity, pursuant to paragraph 2.20. A tender valid for a shorter period shall be rejected by the Procuring entity as non-responsive.

2.14.9 In exceptional circumstances, the Procuring entity may solicit the Tenderer's consent to an extension of the period of validity. The request and the responses thereto shall be made in writing. The tender security provided under paragraph 2.14 shall also be suitably extended. A tenderer may refuse the request without forfeiting its tender security. A tenderer granting the request will not be required nor permitted to modify its tender.

2.16 Format and Signing of Tender

2.16.1 The Procuring entity shall prepare two copies of the tender, clearly marking each "ORIGINAL TENDER" and "COPY OF TENDER," as appropriate. In the event of any discrepancy between them, the original shall govern.

2.16.2 The original and all copies of the tender shall be typed or written in indelible ink and shall be signed by the tenderer or a person or persons duly authorized to bind the tenderer to the contract. All pages of the tender, except for un-amended printed literature, shall be initialed by the person or persons signing the tender.

2.16.3 The tender shall have no interlineations, erasures, or overwriting except as necessary to correct errors made by the tenderer, in which case such corrections shall be initialed by the person or persons signing the tender.

2.17 Sealing and Marking of Tenders

2.17.1 The Tenderer shall seal the original and each copy of the tender in separate envelopes, duly marking the envelopes as "ORIGINAL" and "COPY." The envelopes shall then be sealed in an outer envelope.

2.17.2   The inner and outer envelopes shall:
(a) be addressed to the Procuring entity at the address given on he Invitation to Tender.

(b) bear the tender number and name in the Invitation to Tender and the words "DO NOT OPEN BEFORE **Thursday, 5th March 2020 at 1100 hours.**

2.17.3 The inner envelopes shall also indicate the name and address of the tenderer to enable the tender to be returned unopened in case it is declared "late".

2.17.4 If the outer envelope is not sealed and marked as required by paragraph 2.17.2, the Procuring entity will assume no responsibility for the tender's misplacement or premature opening.

2.18 Deadline for Submission of Tenders

2.18.1 Tenders must be received by the Procuring entity at the address specified under paragraph 2.17.2 not later than **Thursday, 5th March 2020 at 1100 hours.**

2.18.2 The Procuring entity may, at its discretion, extend this deadline for the submission of tenders by amending the tender documents in accordance with paragraph 2.6, in which case all rights and obligations of the Procuring entity and candidates previously subject to the deadline will therefore be subject to the deadline as extended

2.18.3 Bulky tenders which will not fit in the tender box shall be received by the procuring entity as provided for in the Appendix.

2.19 Modification and Withdrawal of Tenders

2.19.1 The tenderer may modify or withdraw its tender after the tender's submission, provided that written notice of the modification, including substitution or withdrawal of the tenders, is received by the Procuring entity prior to the deadline prescribed for submission of tenders.

2.19.2 The Tenderer's modification or withdrawal notice shall be prepared, sealed, marked, and dispatched in accordance with the provisions of paragraph 2.17. A withdrawal notice may also be sent by cable, telex but followed by a signed confirmation copy, postmarked not later than the deadline for submission of tenders.

2.19.3 No tender may be modified after the deadline for submission of tenders.

2.19.4 No tender may be withdrawn in the interval between the deadline for submission of tenders and the expiration of the period of tender validity specified by the tenderer on the Tender Form. Withdrawal of a tender during this interval may result in the Tenderer's forfeiture of its tender security, pursuant to paragraph 2.14.7

2.20 Opening of Tenders

2.20 The Procuring entity will open all tenders in the presence of tenderers' representatives who choose to attend, at **1100 hours on Thursday, 5th March 2020** and in the following location.

KCAA Auditorium, on Ground floor, Aviation House, JKIA Nairobi

The tenderers' representatives who are present shall sign a tender opening register evidencing their attendance.

2.20.1 The tenderers' names, tender modifications or withdrawals, tender prices, discounts and the presence or absence of requisite tender security and such other details as the Procuring entity, at its discretion, may consider appropriate, will be announced at the opening.

2.20.2 The Procuring entity will prepare minutes of the tender opening.

2.21 Clarification of Tenders

2.21.1 To assist in the examination, evaluation and comparison of tenders the Procuring entity may, at its discretion, ask the tenderer for a clarification of its tender. The request for clarification and the response shall be in writing, and no change in the prices or substance of the tender shall be sought, offered, or permitted.

2.21.2 Any effort by the tenderer to influence the Procuring entity in the Procuring entity's tender evaluation, tender comparison or contract award decisions may result in the rejection of the tenderers' tender.

2.22 Preliminary Examination and Responsiveness

2.22.1 The Procuring entity will examine the tenders to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the tenders are generally in order.

2.22.2 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail, and the total price shall be corrected. If the candidate does not accept the correction of the errors, its tender will be rejected, and its tender security may be forfeited. If there is a discrepancy between words and figures the amount in words will prevail

2.22.3 The Procuring entity may waive any minor informality or non-conformity or irregularity in a tender which does not constitute a material deviation, provided such waiver does not prejudice or effect the relative ranking of any tenderer.

2.22.4 Prior to the detailed evaluation, pursuant to paragraph 2.23 the Procuring entity will determine the substantial responsiveness of each tender to the tender documents. For purposes of these paragraphs, a substantially responsive tender is one, which conforms to all the terms and conditions of the tender documents without material deviations. The Procuring entity's determination of a tender's responsiveness is to be based on the contents of the tender itself without recourse to extrinsic evidence.

2.22.5 If a tender is not substantially responsive, it will be rejected by the Procuring entity and may not subsequently be made responsive by the tenderer by correction of the non conformity.

2.23 Conversion to Single Currency

2.23.1 Where other currencies are used, the Procuring Entity will convert those currencies to Kenya Shillings using the selling exchange rate on the date of tender closing provided by the Central Bank of Kenya.

2.24 Evaluation and Comparison of Tenders

2.24.1 The Procuring entity will evaluate and compare the tenders which have been determined to be substantially responsive, pursuant to paragraph 2.22

2.24.2 The Procuring entity's evaluation of a tender will exclude and not take into account

(a)   in the case of equipment manufactured in Kenya or equipment of foreign origin already located in Kenya, sales and other similar taxes, which will be payable on the goods if a contract is awarded to the tenderer; and

(b)   any allowance for price adjustment during the period of execution of the contract, if provided in the tender.

2.24.3 The comparison shall be of the ex-factory/ex-warehouse/off-the-shelf price of the goods offered from within Kenya, such price to include all costs, as well as duties and taxes paid or payable on components and raw material incorporated or to be incorporated in the goods.

2.24.4 The Procuring entity's evaluation of a tender will take into account, in addition to the tender price and the price of incidental services, the following factors, in the manner and to the extent indicated in paragraph 2.23.5 and in the technical specifications:
(a) delivery and installation schedule offered in the tender;
(b) deviations in payment schedule from the specifications in the Special Conditions of Contract;
(c) the cost of components, mandatory spare parts and service;
(d) the availability in Kenya of spare parts and after-sales service for the equipment offered in the tender;

2.24.5   Pursuant to paragraph 2.24.4 the following evaluation methods will be applied
(a)   *Delivery schedule*
(i)   The Procuring entity requires that the equipment under the Invitation for Tenders shall be delivered at the time specified in the Schedule of Requirements. Tenders offering deliveries longer than the procuring entity's required delivery time will be treated as non-responsive and rejected.

(b)   *Deviation in payment schedule*
Tenderers shall state their tender price for the payment of schedule outlined in the special conditions of contract. Tenders will be evaluated on the basis of this base price. Tenderers are, however, permitted to state an alternative payment schedule and indicate the reduction in tender price they wish to offer for such alternative payment schedule. The Procuring entity may consider the alternative payment schedule offered by the selected tenderer.

(c)   *Spare parts and after sales service facilities*
Tenderers must offer items with service and spare parts back-up. Documentary evidence and locations of such back-up must be given. Where a tenderer offers items without such back-up in the country, he must give a documentary evidence and assurance that he will establish adequate back-up for items supplied.

2.24.6 The tender evaluation committee shall evaluate the tender within 30 days of the validity period from the date of opening the tender.

2.24.7 Preference where allowed in the evaluation of tenders shall not exceed 15%.

2.25 Contacting the Procuring Entity

2.25.1 Subject to paragraph 2.21 no tenderer shall contact the Procuring entity on any matter related to its tender, from the time of the tender opening to the time the contract is awarded.

2.25.2 Any effort by a tenderer to influence the Procuring entity in its decisions on tender, evaluation, tender comparison, or contract award may result in the rejection of the Tenderer's tender.

2.26 Award of Contract

(a)   **Post-Qualification**

2.26.1 In the absence of pre-qualification, the Procuring entity will determine to its satisfaction whether the tenderer that is selected as having submitted the lowest evaluated responsive tender is qualified to perform the contract satisfactorily.

2.26.2 The determination will take into account the tenderer financial, technical, and production capabilities.   It will be based upon an examination of the documentary evidence of the tenderers qualifications submitted by the tenderer, pursuant to paragraph 2.12.3 as well as such other information as the Procuring entity deems necessary and appropriate.

2.26.3 An affirmative determination will be a prerequisite for award of the contract to the tenderer. A negative determination will result in rejection of the Tenderer's tender, in which event the Procuring entity will proceed to the next lowest evaluated tender to make a similar determination of that Tenderer's capabilities to perform satisfactorily.

(c)   Award Criteria

2.26.4 The Procuring entity will award the contract to the successful tenderer(s) whose tender has been determined to be substantially responsive and has been determined to be the lowest evaluated tender, provided further that the tenderer is determined to be qualified to perform the contract satisfactorily.

2.26.5 To qualify for contract awards, the tenderer shall have the following:

   a) Necessary qualifications, capability experience, services, equipment and facilities to provide what is being procured.
   b) Legal capacity to enter into a contract for procurement
   c) Shall not be insolvent, in receivership, bankrupt or in the process of being wound up and is not the subject of legal proceedings relating to the foregoing.
   d) Shall not be debarred from participating in public procurement.

(d)   Procuring Entity's Right to accept or Reject any or All Tenders

2.26.6 The Procuring entity reserves the right to accept or reject any tender, and to annul the tendering process and reject all tenders at any time prior to contract award, without thereby incurring any liability to the affected tenderer or tenderer of the grounds for the procuring entity's action

2.26.7 The procuring entity may at any time terminate procurement proceedings before contract award and shall not be liable to any person for the termination

2.26.8 The procuring entity shall give prompt notice of the termination to the tenderers and on request give its reasons for termination within 14 days of receiving the request from any tenderer.

2.26.9 A tenderer who gives false information in the tender document about is qualification or who refuses to enter into a contract after notification of contract award shall be considered for debarment from participating in future public procurement.

2.27   Notification of Award

2.27.1 Prior to the expiration of the period of tender validity, the Procuring entity will notify the successful tenderer in writing that its tender has been accepted.

2.27.2 The notification of award will signify the formation of the Contract but will have to wait until the contract is finally signed by both parties. Simultaneous other tenderers shall be notified that their tenders have not been successful.

2.27.3 Upon the successful Tenderer's furnishing of the performance security pursuant to paragraph 2.29, the Procuring entity will simultaneously inform the other tenderers that this tenderers have not been successful

2.28   Signing of Contract

2.27.4 At the same time as the Procuring entity notifies the successful tenderer that its tender has been accepted, the procuring entity will simultaneously inform the other tenderers that their tenders have not been successful.

2.27.5 Within fourteen (14) days of receipt of the Contract Form, the successful tenderer shall sign and date the contract and return it to the Procuring entity.

2.27.6 The parties to the contract shall have it signed within 30 days from the date of notification of contract award unless there is an administrative review request.

2.29   Performance Security

2.29.1 Within Thirty (30) days of the receipt of notification of award from the Procuring entity, the successful tenderer shall furnish the performance security in

accordance with the Conditions of Contract, in the Performance Security Form provided in the tender documents, or in another form acceptable to the Procuring entity.

2.29.2 Failure of the successful tenderer to comply with the requirements of paragraph 2.28 or paragraph 2.29 shall constitute sufficient grounds for the annulment of the award and forfeiture of the tender security, in which event the Procuring entity may make the award to the next lowest evaluated Candidate or call for new tenders.

2.30 Corrupt or Fraudulent Practices

2.30.1 The procuring entity requires that tenderers observe the highest standard of ethics during the procurement process and execution of contracts. A tenderer shall sign a declaration that he has and will not be involved in corrupt or fraudulent practices.

2.30.2 The Procuring entity will reject a proposal for award if it determines that the tenderer recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question.

2.30.3 Further a tenderer who is found to have indulged in corrupt or fraudulent practices risks being debarred from participating in public Procurement in Kenya.

APPENDIX TO INSTRUCTIONS TO TENDERERS

The following information for procurement of the goods shall complement or amend the provisions of the instructions to tenderers. Wherever there is a conflict between the provisions of the instructions to tenderers and the provisions of the appendix, the provisions of the appendix herein shall prevail over those of the instructions to tenderers:

Instructions to tenderers	Particulars of appendix to instructions to tenderers
2.1	The eligible vendor shall **Supply, Deliver, Install and Commission an Air Traffic Management System at Jomo Kenyatta International Airport**.
2.3.2	The price to be charged for the tender document shall be KES 1,000 and free for downloading from the website.
2.5	A mandatory Pre-Bid meeting will take place at the following date, time and place: Date: **Tuesday, 19/02/2020** Time: **1100 hours** Place: **KCAA Headquarters, Aviation House**
2.10	Tender Prices to be given in Kenya Shillings or any other freely convertible foreign currency and should include all taxes (DDP 2010).
2.12	**Tenderers Eligibility and Qualifications;** A bidder must be a system manufacturer or a consortium of manufacturers.
2.14	Bidders shall provide a tender security of **KES.2,500,000/-** or equivalent in easily convertible foreign currency based on Central Bank of Kenya prevailing rate during the day of tender opening in form of a banker's cheque, bank guarantee or Insurance Guarantee from a reputable insurance company recognized by PPRA. The tender security should be valid for 150 days from the date of tender opening.
2.15	**Validity of Tenders**: Tender shall remain valid for a period of 150 days from the date of the tender opening.
2.17	The bidder shall provide paginated two hard copies and a soft copy comprising of: **1 original document in paper format,** 1 copy (hard) and **1 soft copy.**
2.18	**Deadline for Submission of Tenders** **Closing Date: Thursday, 5th March 2020 at 1100 hours.**
2.18.3	Bulky bidding documents which will not fit in the tender box shall be received and recorded at the Manager Procurement Office, on ground floor, Aviation House, at JKIA Nairobi.
2.20	The bidding documents will be opened in public immediately after the time of closing the tender.
2.22	Evaluation of the tenders shall be done using the criteria set out in the tender document.
2.24	Due diligence: KCAA shall perform a due diligence after Tender evaluation process and before award of tender which may include but not limited to: • Interviewing technical staff • Verification of company premises • Visiting referees sites • Verification of performance of the ATM at refereed sites • Demonstration of the proposed system at a site to be agreed
2.27	The successful bidder shall provide a performance security of 10% of the Contract value.

SECTION III - GENERAL CONDITIONS OF CONTRACT

Table of Contents

page

SECTION III   -   GENERAL CONDITIONS OF CONTRACT

3.1 Definitions

3.1.1 In this Contract, the following terms shall be interpreted as indicated:-

(a)   "The Contract" means the agreement entered into between the Procuring entity and the tenderer, as recorded in the Contract Form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.

(b)   "The Contract Price" means the price payable to the tenderer under the Contract for the full and proper performance of its contractual obligations

(c)   "The Goods" means all of the equipment, machinery, and/or other materials, which the tenderer is required to supply to the Procuring entity under the Contract.

(d)   "The Procuring entity" means the organization purchasing the Goods under this Contract.

(e)   "The Tenderer' means the individual or firm supplying the Goods under this Contract.

3.2   Application

3.2.1 These General Conditions shall apply in all Contracts made by the Procuring entity for the procurement installation and commissioning of equipment to the extent that they are not superseded by provisions of other part of contract.

3.3   Country of Origin

3.3.1 For purposes of this clause, "Origin" means the place where the Goods were mined, grown or produced.

3.3.1 The origin of Goods and Services is distinct from the nationality of the tenderer and will be treated thus in the evaluation of the tender.

3.4   Standards

3.4.1 The Goods supplied under this Contract shall conform to the standards mentioned in the Technical Specifications.

3.5   Use of Contract Documents and Information

3.5.1 The Candidate shall not, without the Procuring entity's prior written consent, disclose the Contract, or any provision therefore, or any specification, plan, drawing, pattern, sample, or information furnished by or on behalf of the Procuring entity in connection therewith, to any person other than a person employed by the tenderer in the performance of the Contract.

3.5.2 The tenderer shall not, without the Procuring entity's prior written consent, make use of any document or information enumerated in paragraph 3.5.1 above

3.5.3 Any document, other than the Contract itself, enumerated in paragraph 3.5.1 shall remain the property of the Procuring entity and shall be returned (all copies) to the Procuring entity on completion of the Tenderer's performance under the Contract if so required by the Procuring entity

3.6 Patent Rights

3.6.1 The tenderer shall indemnify the Procuring entity against all third-party claims of infringement of patent, trademark, or industrial design rights arising from use of the Goods or any part thereof in the Procuring entity's country

3.7 Performance Security

3.7.1 Within twenty eight (28) days of receipt of the notification of Contract award, the successful tenderer shall furnish to the Procuring entity the performance security where applicable in the amount specified in Special Conditions of Contract.

3.7.2 The proceeds of the performance security shall be payable to the Procuring entity as compensation for any loss resulting from the Tenderer's failure to complete its obligations under the Contract.

3.7.3 The performance security shall be denominated in the currency of the contract, or in a freely convertible currency acceptable to the procuring entity and shall be in the form of
  a) Cash
  b) Bank guarantee
  c) Such insurance guarantee approved by the Authority
  d) Letter of credit

3.7.4 The performance security will be discharged by the Procuring entity and returned t the Candidate not late than thirty (30) days following the date of completion of the Tenderer's performance obligations under the Contract, including any warranty obligations, under the Contract

3.8 Inspection and Tests

3.8.1 The Procuring entity or its representative shall have the right to inspect and/or to test the equipment to confirm their conformity to the Contract specifications. The Procuring entity shall notify the tenderer in writing in a timely manner, of the identity of any representatives retained for these purposes.

3.8.2 The inspections and tests may be conducted in the premises of the tenderer. All reasonable facilities and assistance, including access to drawings and production data, shall be furnished to the inspectors at no charge to the Procuring entity.

3.8.3 Should any inspected or tested equipment fail to conform to the Specifications, the Procuring entity may reject the equipment, and the tenderer shall either replace the rejected equipment or make alterations necessary to make specification requirements free of costs to the Procuring entity.

3.8.4 The Procuring entity's right to inspect test and where necessary, reject the equipment after the equipment arrival and installation shall in no way be limited or waived by reason of the equipment having previously been inspected, tested and passed by the Procuring entity or its representative prior to the equipment delivery.

3.8.5 Nothing in paragraph 3.8 shall in any way release the tenderer from any warranty or other obligations under this Contract.

3.9 Packing

3.9.1 The tenderer shall provide such packing and packaging of the equipment as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the Contract.

3.9.2 The packing, marking, and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract

3.10 Delivery and Documents

3.10.1 Delivery of the equipment, documents and installation of the same shall be made by the tenderer in accordance with the terms specified by Procuring entity in its Schedule of Requirements and the Special Conditions of Contract

3.11 Insurance

3.11.1 The equipment supplied under the Contract shall be fully insured against loss or damage incidental to manufacturer or acquisition, transportation, storage, and delivery in the manner specified in the Special conditions of contract.

3.12 Payment

3.12.1 The method and conditions of payment to be made to the tenderer under this Contract shall be specified in Special Conditions of Contract

3.12.2 Payments shall be made promptly by the Procuring entity as specified in the contract

3.12 Prices

3.12.3 Prices charged by the tenderer for equipment delivered and installation performed under the Contract shall not, with the exception of any price adjustments authorized in Special Conditions of Contract, vary from the prices by the tenderer in its tender.

3.12.4 Contract price variations shall not be allowed for contracts not exceeding one year (12 months)

3.12.5 Where contract price variation is allowed, the variation shall not exceed 10% of the original contract price.

3.12.6 Price variation requests shall be processed by the procuring entity within 30 days of receiving the request.

3.13 Assignment

The tenderer shall not assign, in whole or in part, its obligations to perform under this Contract, except with the Procuring entity's prior written consent

3.15. Subcontracts

3.15.1 The tenderer shall notify the Procuring entity in writing of all subcontracts awarded under this Contract if not already specified in the tender. Such notification, in the original tender or later, shall not relieve the tenderer from any liability or obligation under the Contract

3.16. Termination for Default

3.16.1 The Procuring entity may, without prejudice to any other remedy for breach of Contract, by written notice of default sent to the tenderer, terminate this Contract in whole or in part

    (a)   if the tenderer fails to deliver any or all of the equipment within the period9s) specified in the Contract, or within any extension thereof granted by the Procuring entity

    (b)   if the tenderer fails to perform any other obligation(s) under the Contract

    (c)   if the tenderer, in the judgment of the Procuring entity has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.

3.16.2 In the event the Procuring entity terminates the Contract in whole or in part, it may procure, upon such terms and in such manner as it deems appropriate, equipment similar to those undelivered, and the tenderer shall be liable to the Procuring entity for any excess costs for such similar equipment.

3.17. Termination for convenience

3.18. Liquidated Damages

3.18.1 If the tenderer fails to deliver and/or install any or all of the items within the period(s) specified in the contract, the procuring entity shall, without prejudice to its other remedies under the contract, deduct from the contract prices liquidated damages sum equivalent to 0.5% of the delivered price of the delayed items up to a maximum deduction of 10% of the delayed goods. After this the tenderer may consider termination of the contract.

3.19. Resolution of Disputes

3.19.1 The procuring entity and the tenderer shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the contract

3.19.2 If, after thirty (30) days from the commencement of such informal negotiations both parties have been unable to resolve amicably a contract dispute, either party may require that the dispute be referred for resolution to the formal mechanisms specified in the SCC.

3.20. Language and Law

3.20.1 The language of the contract and the law governing the contract shall be English language and the Laws of Kenya respectively unless otherwise specified in the SCC

3.21. Force Majeure

3.21.1 The Tenderer shall not be liable for forfeiture of its performance security or termination for default if and to the extent that it's delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.

3.22 Notices

3.22.1 Any notice given by one party to the other pursuant to this contract shall be sent to other party by post or by fax or Email and confirmed in writing to the other party's address specified.

3.22.2 A notice shall be effective when delivered or on the notices effective date, whichever is later.

SECTION IV - SPECIAL CONDITIONS OF CONTRACT

4.1   Special conditions of contract shall supplement the general conditions of contract, wherever there is a conflict between the GCC and the SCC, the provisions of the SCC herein shall prevail over those in the GCC.

4.2   Special conditions of contract with reference to the general conditions of contract.

General conditions of contract reference	Special conditions of contract
3.6	The eligible vendor shall **Supply, Deliver, Install and Commission An Air Traffic Management System at Jomo Kenyatta International Airport & slave terminal in Eastleigh Airport** in Nairobi.
3.7	Bidder to provide a performance security 10% of the Contract price
3.12	Payment will be made within 30 days upon receipt of invoices for every milestone as will be agreed in the contract.
3.13	Price adjustments not allowed
3.20	As per the laws of Kenya

SECTION V – SCHEDULE OF REQUIREMENTS

Notes for preparing the schedule of requirements

The schedule of requirements for the goods shall be included in the tender documents by the KCAA and shall cover at the minimum a description of the goods and services to be supplied and the delivery schedule.

The objectives of schedule of requirements is to provide sufficient information to enable tenderers to prepare their tenders efficiently and accurately, in particular, the price schedule, for which information is provided.

In addition, the schedule of requirements, together with the price schedule, should serve as basis in the event of quantity variations at the time of award of contract pursuant to instructions to tenderers clause 2.26.

The date or period of delivery should be clearly specified, taking into account the date prescribed herein from which the KCAA's delivery obligations start (notice of award).

SECTION VI – TECHNICAL SPECIFICATION FOR JOMO KENYATTA INTERNATIONAL AIRPORT NEW AIR TRAFFIC MANAGEMENT SYSTEM.

JKIA NEW AIR TRAFFIC MANAGEMENT SYSTEM- OPERATIONAL CONCEPT

PURPOSE:

The current Air Traffic Management (ATM) System was commissioned in 2010 and has been operational for a period of 9 years. Several software upgrades have been conducted but the system has not stabilized posing a very serious safety and security concern in the entire airspace. The unsuccessful upgrade of the system has also led to inability of the users to fully employ the simulators thus eroding the much required high level updating of the airspace procedures and on-the –Job training. The purchase of this new equipment is a stop-gap measure to forestall the current outages experienced by the current system and the unsuccessful upgrades that have so far taken place, as indicated in the "necessity for replacement of current system" as indicated below. The operational concept for this new ATM system, described below will ensure continued delivery of services and benefits to airspace users in line with the ANS master plan but to a limited scope, not covering the entire ATM setup country wide; it is only geared to replacement of the existing system in JKIA   for the purpose of sustaining the operations while meeting national security requirements.

This operational concept depicts the current setup and is independent of technology, recognizing need for change including integration with existing facilities and the fact that much of the technology existing may become obsolete. This operational concept is therefore developed with the purpose of ensuring continuity in service delivery incorporating the current installed facilities such as, Military operation working position, Surface movement and control guidance System (SMCGS), New Wilson tower equipment, Multilateration (MLAT), Electronic Flight Stripping (EFS) system and Search and Rescue (SAR) software not integrated into the current system.

The concept facilitates the need to implement a parallel system as a backup to avoid flight flow disruption when one system experiences challenges

The concept takes cognizance of the need to provide air traffic management through collaborative integration of humans, information, technology, facilities and services, supported by air, ground and/or space-based communications, navigation and surveillance.

REFERENCE:
   a. *Kenya Civil Aviation Authority Airspace master plan 2015-2030;*
   b. *ICAO ATMOC DOC 9854;*
   c. *GANP DOC 9750;*
   d. *AFI Plan;*

NECESSITY FOR REPLACEMENT OF CURRENT ATM SYSTEM:

The ATM environment in Kenya is driven by the need to maintain safety and stakeholder expectations. These expectations are included in the ANS Master plan and enshrined in the service charter. The current system has numerous limitation which include:

a. Inability to support new equipment such as SMGCS,, EFS, New SAR software already procured and ready for operationalization;

b. System inefficiency occasioned by numerous outages and unsatisfactory software upgrade;

c. Restrictions in development of homogeneous airspace divisions and route structures, thus limiting system operational expansion including inclusion of a Military operational working position.

d. Lack of dedicated/ independent data processor backing up sufficient data for real time use.

e. The other limitations of the current ATM system result in inefficient aircraft operations such as requirement to predict arrival and departing flights, manage air traffic flow, operation of aircraft at inefficient altitudes, speeds and in unfavorable winds; and insufficient flexibility to permit optimum management of weather-related disruptions.

CURRENT SYSTEM:

The description of the current system gives a proposal in the context of existing ANS activities. Several terminal control areas (TMAs) have been created as standalone units not connected to the current area control center and on a pseudo- analogue setup.

The current system in Area Control Center (ACC) is only connected to Nairobi TMA and enables automatic exchange of data with JKIA tower, Wilson tower and Eastleigh tower. The ACC is divided into three (3) sectors Enroute South (ENR-S), Enroute North (ENR-N) and Flight Information Center (FIC) each having a controller working position (CWP) fitted with a planner and an executive position. Other positions in the ACC include a supervisor position (SUP) and a Flight Data operations (FDO) Position. The exchanged data include Aeronautical information (AIXM), Flight information data (FIXM), Weather information (WIXM) and surveillance data (SDPS).

The Nairobi TMA, which is connected to the ACC, has two CWP (each fitted with a planner and an executive position) and is connected to other CWPs in the towers of JKIA where there exists a single CWP with a planner and an executive position and a standalone ground position; Wilson tower with a single CWP including a planner and an executive position where there exists a standalone ground position and Eastleigh tower where there is a single CWP with a planner and an executive position. The

current equipment is also fitted with a simulator and a synchronized audio and video playback position.

The diagrams below show the description of the current ATM system in JKIA.

ACC CWPs

FDO PSN	SUP PSN

FIC EXEC

FIC PLAN

ACC South PLAN	ACC South EXEC	ACC North EXEC	ACC North PLAN

MIL Desk

APP CWPs-JKIA

APP PLAN Safety	APP EXEC (Safety)	APP CWP EXEC	APP CWP PLAN

Simulator-JKIA

SIMU PLAN	SIMU CWP (EXEC)	SIMU CWP (EXEC)	SIMU PLAN

PILOT PSN	PILOT PSN

Tower CWPs-JKIA

TWR AIR (EXEC)	TWR AIR (PLAN)	TWR GND

Tower CWPs-Wilson/Eastlight

TWR AIR (EXEC)	TWR AIR (PLAN)	TWR GND	TWR PSN-HKRE

Replay & Recording STN

Replay & Recording STN

Data sharing between ACC, Nairobi TMA and the towers in JKIA, Wilson and Eastleigh.

Description of Operational Requirements of New Equipment:

The current system does not meet the operational requirements as envisaged thus the need to replace it.

The ATM system in JKIA will be equipped with appropriate controller working positions capable of receiving data via fiber and/ or VSAT and inter unit / terminal area connection via AIDC and AMHS.

Eventually the new system will facilitate implementation of a parallel system (the disaster Recovery System-DRS) which will act as a backup to avoid flight flow disruption when one system experiences challenges.
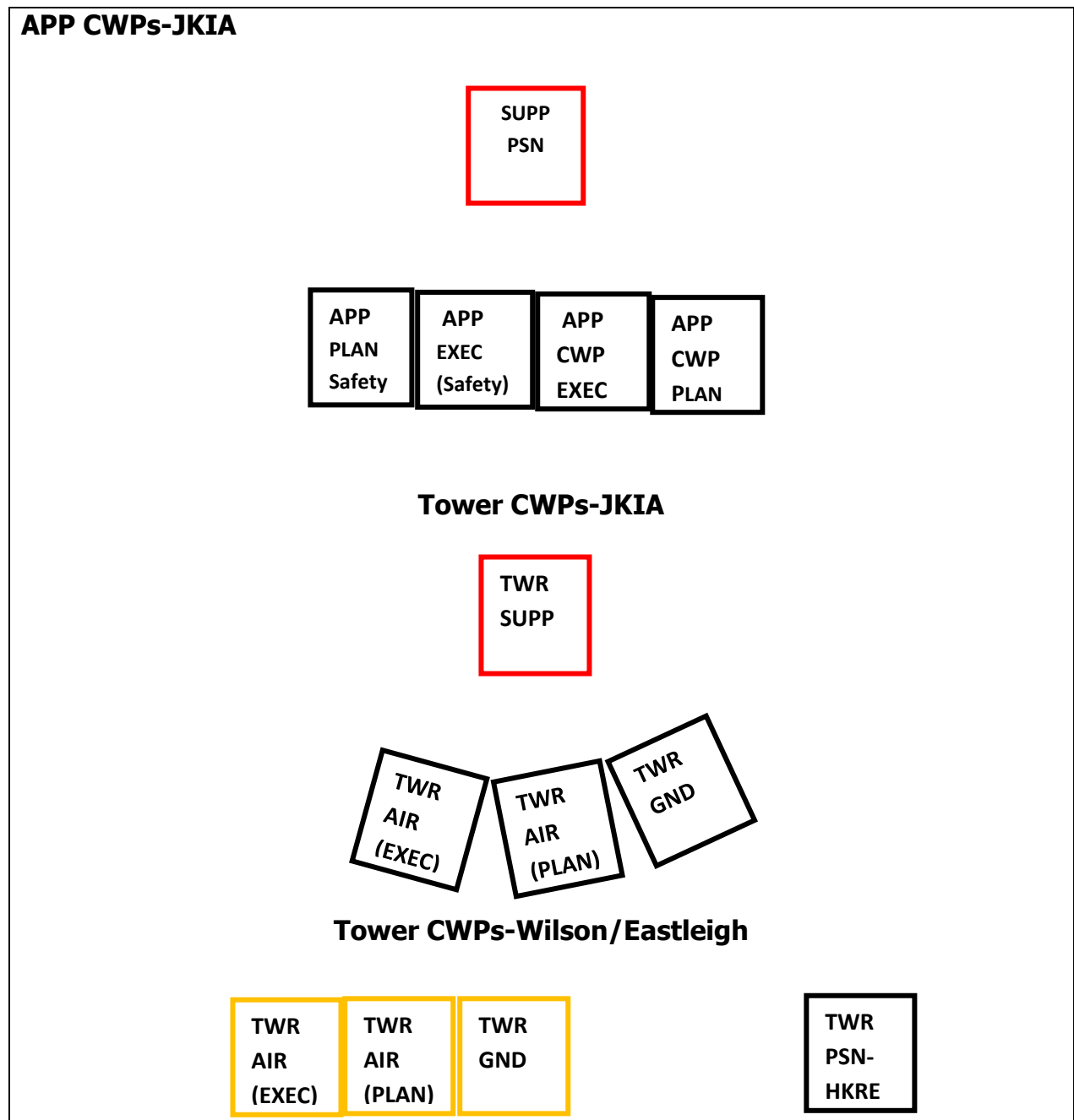
a. NAIROBI TMA:
The ATM system for approach will consist of five (5) CWPs each with an executive and a planning position.

i. **JKIA Tower:** Two (2) CWPs to be located at the JKIA control tower with one tower air position and the other ground position to be integrated with the current Advanced Surface Movement Ground Control System (A-SMGCS). All positions will be fitted with an EFS, a strip printer, strip rack, surveillance display and configured with a VCCS. The EFS will be used primarily with paper strip as backup. A Supervisor position shall be installed capable of augmenting CWP operations and enable management of both tower and ground operations.

ii. **Nairobi Approach:** There will be two (2) CWPs in the approach control office and a supervisor position fully fitted with a console equipped with VHF capable of overriding all operational positions, EFS, strip printer and strip rack. All positions will be fitted with an EFS, a strip printer, strip rack, surveillance display and configured to VCCS. The EFS will be used primarily with paper strip as backup.

iii. **Eastleigh Airport:** There will be one (1) CWP equipped with EFS, strip printer, strip rack, surveillance display and configured to VCCS.

iv. **Wilson Airport:** There will be no need to equip Wilson tower since the equipment is newly installed, nevertheless there will be need to integrate data to the existing new equipment for compatibility.

b. Each CWP will be fitted with a system clock and VDF display window (as in the case of Wilson) all inbuilt into the controller's screen/ plan position indicator (PPI).
c. Servers to the simulator shall be independent from the main CWP servers so as to facilitate smooth provision of services during system failure associated with main servers and shall receive data simultaneously with the main servers.

"SLAVE FEED" TO THE CONTROL TOWERS (JKIA, Eastleigh and Wilson):

Each control tower in the JKIA terminal control area shall be fed with all the required data which include AIXM, FIXM, surveillance data and where applicable WIXM where available. This will include data exchange between Nairobi Approach and control towers in Jomo Kenyatta; Wilson and Eastleigh;

The slave feed work positions should be extended from the JKIA ; this should ensure compatibility of equipment for ease of data exchange between tower units and JKIA TMA.

APP CWPs-JKIA

	SUPP PSN

APP PLAN Safety	APP EXEC (Safety)	APP CWP EXEC	APP CWP PLAN

Tower CWPs-JKIA

TWR SUPP

TWR AIR (EXEC)	TWR AIR (PLAN)	TWR GND

Tower CWPs-Wilson/Eastleigh

TWR AIR (EXEC)	TWR AIR (PLAN)	TWR GND		TWR PSN-HKRE

The Area Control Center will be comprised of at 25 configurable CWPs.

The sectors are divided as follows:

a) **Area North West Sector:** One (1) fully fledged controller working position (CWP) which includes an executive and a planning position.

b) **Area North East Sector:** One (1) fully fledged controller working position (CWP) which includes an executive and a planning position.

c) **Area South West Sector:** One (1) fully fledged controller working position (CWP) which includes an executive and a planning position.
d) **Area South East Sector:** One (1) fully fledged controller working position (CWP) which includes an executive and a planning position.
e) **Oceanic Sector:** One (1) fully fledged controller working position (CWP) which includes an executive and a planning position.
f) **Upper Airspace Control Center:** One (1) fully fledged controller working position (CWP) which includes an executive and a planning position.
g) **Flight Information Center North:** One (1) fully fledged controller working position (CWP) which includes an executive and a planning position.
h) **Flight information Center South:** One (1) fully fledged controller working position (CWP) which includes an executive and a planning position.

The system shall be configured to accommodate the following functionalities:

a) Air Traffic Flow Management Unit,
b) Search and Rescue,
c) Military,
d) Supervisor Positions,
e) Flight Data Operator Position,
f) Air Traffic Flow Management Position,

ATC Simulator: The ATC simulator to be used by both approach and area control center, will consist of four (4) CWPs which include an executive and a planning position, the simulator should be positioned in an adjacent room and should be connected to data feeds which include AIXM, FIXM, radar surveillance data and WIXM. The simulator should be equipped with a separate server independent from the main server doubling up as a backup position, training simulator (for proficiency and competency) and airspace research planning.

For each CWP there will be installed a system clock and VDF display window (in the case of Wilson) all inbuilt into the controllers screen/ plan position indicator (PPI). All area control positions should have capability of performing data communication with priority as indicated by supervisory position.

The ACC CWPs and simulator work positions are as illustrated below:

ACC CWPs

FDO
PSN

MIL
Desk

FIC
North
PLAN

FIC
North
EXEC

FIC
South
EXEC

FIC
South
PLAN

FIC
SUPP
PSN

ACC
N/W
EXEC

ACC
North
PLAN

ACC
N/E
EXEC

SUP
ACC N/S
PSN

ACC
S/E
EXEC

SUP
Oceanic/
Upper
Airspace
PSN

ACC
South
PLAN

Oceanic

Upper
Airspac
e

ACC
S/W
EXEC

Simulator-JKIA

SIMU
PLAN

SIMU
CWP
(EXEC)

SIMU
CWP
(EXEC)

SIMU
PLAN

PILOT
PSN

PILOT
PSN
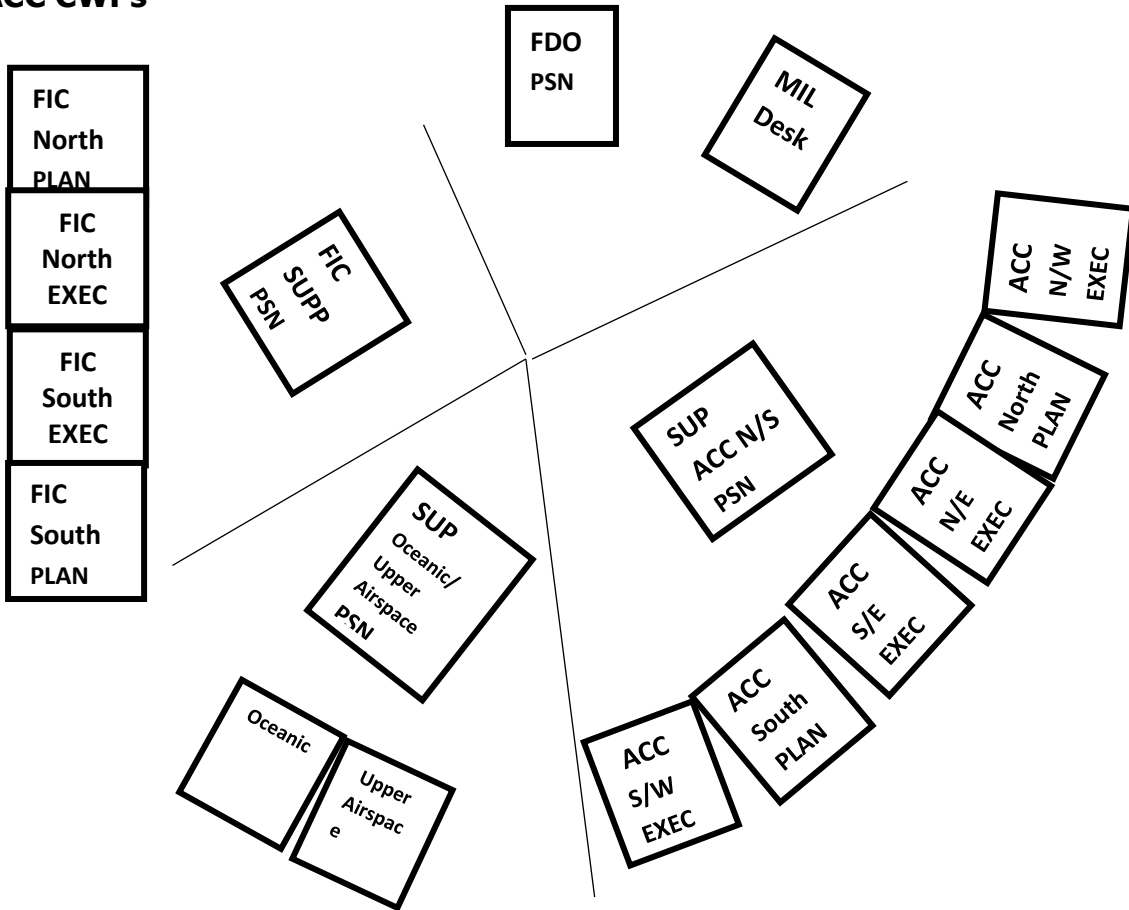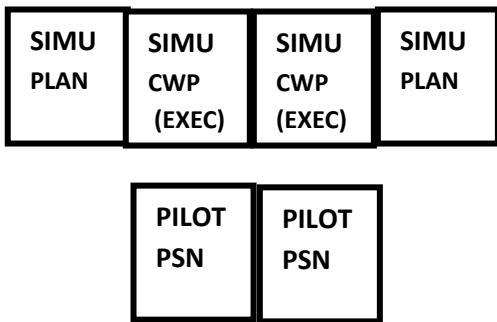
TECHNICAL SPECIFICATIONS FOR ATM SYSTEM FOR JKIA

1.   Introduction

1.1.   The Kenya Civil Aviation Authority (KCAA) provides Air Navigation Services (ANS) for Nairobi Flight Information Region (FIR) including International Civil Aviation Organization (ICAO) delegated airspaces;

1.2.   The air navigation services are realized through Air Traffic Management (ATM) as well as Aeronautical Information Services / Management (AIS/AIM) operations within the FIR. These services are enabled through Communications, Navigation and Surveillance (CNS) infrastructure in the FIR;

1.3.   The Nairobi Communication Centre is a regional hub for relay of aeronautical information messages via Aeronautical Fixed Telecommunications Network / Aeronautical Message Handling System (AFTN/AMHS) to and from other regions in Africa;

1.4.   The paragraphs below describe the present set up of ATM and AIS/AIM operations as well as the supporting CNS infrastructure;
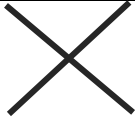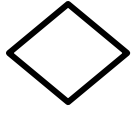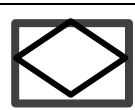
2.   ATM System Setup in Kenya

2.1.   ATM civilian services are provided in terminal areas of Nairobi, Mombasa, Eldoret and Wajir airports and military services from Laikipia. The respective approach control offices are located at Jomo Kenyatta International Airport (JKIA) control tower, Moi International Airport (MIA) control tower, Eldoret International Airport control tower and Wajir Airport control tower for civilian operations and Nanyuki tower for military services. Area Control Offices for area control operations for Nairobi FIR are also located at JKIA control tower;

2.2.   The Nairobi Terminal Area (TMA) operations includes two other airports located at Wilson and Eastleigh; Mombasa TMA takes care of Moi International Airport, Malindi and Ukunda airport operations whereas Eldoret TMA includes Eldoret tower and Kisumu International Airport (KIA). Other airports include Isiolo, Lodwar, Lamu and Lokichoggio;

2.3.   The terminal operations are managed by local Very High Frequency (VHF) radio transmitters and receivers for controller-pilot communications as well as aeronautical data terminals for transmission and reception of flight plans and other information such as weather. All airports have AIS/AIM terminals connected to a centralized database of Briefing and International NOTAM Offices in JKIA, Nairobi. Information to/from these airports are relayed via the AFTN/AMHS switch located at JKIA control tower;

2.4.   Nairobi and Mombasa TMAs have terminal radar equipment composed of Primary (PSR) and Mono-pulse mode-S Secondary Surveillance radars (MSSR-S) and associated surveillance and flight plan data processing systems used for enhanced control of air traffic;

2.5.   Area Control operations based at the Area Control Centre (ACC) in JKIA control tower building is managed by area VHF radio transmitters and receivers installed at Ngong' Hills, Mua Hills, Eldoret, Mombasa, Wajir, Malindi and Poror.

Surveillance data for area control services is provided by MSSR-S from Poror, Eldoret, Mua Hills, Mombasa, Nairobi and Wajir;

2.6.   KCAA has also installed CPDLC/ADS-C for provision of services in the Oceanic area;

2.7.   To complement existing surveillance means, KCAA has implemented and operationalized ADS-C and is in the process of implimenting ADS-B and MLAT;

2.8.   Information comprising Air Traffic Service /Direct Speech (ATS/DS), VHF radio voice and data (AFTN/AMHS, radar, ADS-B) are relayed to the ACC via a domestic VSAT (Very Small Aperture Terminal) mesh topology network, whose hub equipment is located at JKIA. The Authority is also implementing a dedicated MPLS (Multi-Protocol Label Switching) network to complement the domestic VSAT network. Some stations such as Mua Hills and Wilson Airport have line-of-sight radio links (WiMax) for data relay with JKIA Station. KCAA has embarked on establishment of an automatic fail-over system between the VSAT network and the MPLS network to ensure redundancy and reduce services outage;

2.9.   For purposes of coordination and relay of aeronautical information (ATS/DS & AFTN/AMHS data) with neighbouring FIRs and other destinations in the region, the North Eastern AFI regional VSAT network (NAFISAT) is utilized;

2.10.   Area Control Services is provided through three sectors of Area Control North, Area Control South and Flight Information Centre (FIC);

2.11.   KCAA therefore invites bids to provide an ATM system for JKIA as described in the following paragraphs;

3.   Operational Requirements and Technical Specifications

3.1.   The services and features required in the ATM module are surveillance (PSR, MSSR-S, ADS-C, ADS-B, WAM, space-based ADS-B), Communication (terminal VHF, VHF Area cover, CPDLC, AFTN/AMHS, AIDC, ATN and ATS-DS), AIM (FIXM, AIXM5.1), MET (WIXM), ATFM, AMAN/DMAN, CDM, and Search and Rescue;

3.2.   Surveillance sensor integration (ADS-B and Radar): The system should be able to integrate all sensors to the ATM system depicting track symbols as indicated below:

	Primary Track Symbol
	ADS B Track Symbol
	MSSR Track symbol
	MSSR combined with PSR Symbol
	MSSR combined with ADS-B Symbol
	All Symbols Combined (PSR, MSSR, ADS-B)

The system should enable selection of specific sensors depending on sector in use as described by KCAA in sectors to be available for use.

The ATM operations data processor should be independent of the simulator data processor thus acting as a backup during outage times thus rendering the simulator capable of performing full back up functions as envisaged.

3.3. **Cyber resilience:** The supplied ATM system should be immune to cyber-attacks by implementing appropriate cyber security measures.

3.4. **Statistics:** The system should be able to automatically generate statistical data required to support ICAO KPI GANP. (Number of aircraft handle per sector, amount of delay per sector based on set KCAA performance target, number of delays per sector, number of TCAS-RA in each sector etc.)

3.5. **ATM System Specifications**

    3.5.1. Scope of Supply:
        3.5.1.1. The scope includes delivery, installation, commissioning and training on the ATC centre equipment meeting the following requirement:
        3.5.1.2. Provide the ATC equipment including the ATC consoles and furniture as per the specified requirement.
        3.5.1.3.
        3.5.1.4. All hardware supplied should be able to operate with voltages of 230 +/- 10% V ac, 50+/- 5% Hz.
        3.5.1.5.   .
    3.5.2. Functional Requirements.
        3.5.2.1.   Basic Functions.

3.5.3. Surveillance Data processor and display for MSSR Mode-S, MLAT/WAM, ADS-C, ADS-B and Space based ADS-B.

3.5.4. Mono Surveillance and multi Surveillance tracking.

3.5.5. Flight Data Processing System and its integration to an existing Billing Management System (BMS).

    3.5.5.1.1. Flight data management and distribution.

    3.5.5.1.2. Electronic Flight strip (EFS) and paper flight strips.

    3.5.5.1.3. Flight plan statistics for billing management.

    3.5.5.1.4. Recording and synchronized replay of data.

    3.5.5.1.5. The systems shall be adaptable in order to support flexible configuration of the Kenyan airspace (sectors, parameterisation, sub-system extension, dynamic sectorisation).

    3.5.5.1.6. Data preparation tools such as mosaic generation, maps generation, strip generation, Flight data and RPLs preparation, QNH grid preparation, and related tools.

    3.5.5.1.7. Technical monitoring and Control.

    3.5.5.1.8. Operator interface, monitoring function, system configuration management, control function.

    3.5.5.1.9. Simulator for training.

    3.5.5.1.10. Air traffic generator, user-friendly graphic interface.

3.5.5.2. **SAFETY NETS**

    3.5.5.2.1. The scope of supply shall include Safety Nets referred to as:

        3.5.5.2.1.1. Short Term Conflict Alert (STCA),

        3.5.5.2.1.2. Minimum Safe Altitude Warning (MSAW),

        3.5.5.2.1.3. Area Proximity Warning (APW),

        3.5.5.2.1.4. Route Adherence Monitoring (RAM),

        3.5.5.2.1.5. Cleared Level Adherence Monitoring (CLAM),

        3.5.5.2.1.6. Danger Area Infringement Warning (DAIW),

        3.5.5.2.1.7. Monitoring Aids (MONA),

        3.5.5.2.1.8. Approach Path Monitor (APM),

        3.5.5.2.1.9. General Infringement Area (GFA),

        3.5.5.2.1.10. Emergency codes annunciation (audio and visual) e.g. RCF, EMG)

        3.5.5.2.1.11. Reduced Vertical Separation Minima (RVSM) and

        3.5.5.2.1.12. Medium Term Conflict Detection (MTCD).

        3.5.5.2.1.13. Upgrading current A-SMGCS to level 2.

        3.5.5.2.1.14. The safety nets shall also be implemented in the simulator environment.

3.5.5.3. **AMHS/AFTN Exchanges**

    3.5.5.3.1. The New ATM System systems shall be able to automatically transmit and receive ATS AMHS/ AFTN messages from relevant Controller positions (Planning and Flight data operator).

3.5.5.3.2. This function shall allow sending ATS AMHS/ AFTN messages as well as free text messages.

3.5.5.3.3. Messages shall be sent conforming to ICAO ATS AMHS/ AFTN messages formats as defined in ICAO document 4444 PANS ATM.

3.5.5.3.4. The bidder shall describe main features of ATS messages transmission processing, including, but not limited to, human machine interface.

3.5.5.3.5. An automatic processing shall make it unnecessary for Controllers to manually fill in ATS messages.

3.5.5.3.6. Before sending messages, an automatic processing shall check:

3.5.5.3.7. The validity of Message Priority (e.g. DD, FF, GG, KK, SS).

3.5.5.3.8. The validity of the AMHS/AFTN address.

3.5.5.3.9. The list of authorized AMHS/AFTN Addresses shall be an adaptable parameter.

3.5.5.4. Inter Centre/Unit Coordination

3.5.5.4.1. The system shall be able to provide silent coordination.

3.5.5.4.2. New ATM System shall be able to interface with adjacent ATS units/ FIRs.

3.5.5.4.3. New ATM System shall be able to exchange the inter centre coordination messages via AMHS/ AFTN network or ATS Interfacility Data Communication (AIDC) protocol as appropriate.

3.5.5.4.4. As far as practicable all emergency messages, movement and control messages and flight information messages shall be transmitted automatically.

3.5.5.4.5. The following above messages shall also be supported for manual transmission and manual reception.

3.5.5.4.6. Messages which are not eligible for automatic processing, or which contain formatting errors shall be routed out for manual processing on relevant positions.

3.5.5.4.7. The Tenderer shall describe main features of Inter centre coordination processing.

3.5.5.5. SSR Mode-S, ADS-C, ADS-B, ADS-B in space, WAM/MLAT, Capabilities

3.5.5.5.1. The new ATM system shall be able to handle SSR Mode S Extended Squitter, VDL4, WAM/MLAT, ADS-C, ADS-B and space based ADS-B data.

3.5.5.5.2. The new ATM system shall handle up to 15 ADS-B ground station lines (each line being redundant)

3.5.5.5.3. The new ATM system shall handle a MLAT/WAM system (each line being redundant) where applicable.

3.5.5.5.4. The new ATM system shall handle an ADS-C input (each line being redundant)

3.5.5.5.5. The new ATM system shall be capable of handling a space based ADS-B input (each line being redundant)

3.5.5.5.6. The new ATM system shall be capable of handling ATFM functions.

3.5.5.5.7. The new ATM system shall be capable of handling UTM functions.

3.5.5.5.8. The new ATM system shall handle up to 10 SSR Mode-S radar lines (each line being redundant)

3.5.5.6. Data Recording and synchronized Replay

3.5.5.6.1. Data recording and synchronized replay shall be part of the New ATM System. Appropriate interface to enable synchronisation of voice and data replay to be provided.

3.5.5.6.2. This function shall give the ability to synchronise any recorded voice and data channel with a given recorded ATM centre position including approach units.

3.5.5.6.3. Synchronisation shall apply when normal speed replay is selected.

3.5.5.6.4. Synchronisation shall be maintained during Start, Freeze (Pause) and Resume Replay commands.

3.5.5.7. Surveillance by-pass

3.5.5.7.1. This feature allows an operator to switch from the normal system track display (integrated) to a local surveillance track display.

3.5.5.7.2. A bypass function shall be provided allowing display of tracks from any individual available sensors SSR Mode S, ADS-C, ADS-B, Space based ADS-B and WAM.

3.5.5.7.3. The By-pass capability shall be provided via a LAN independent from the main redundant ATC LAN.

3.5.5.7.4. Sub-system architecture shall make available by-pass surveillance data at all times.

3.5.5.7.5. The controller working positions shall automatically switch to bypass mode on detection of the non-availability of integrated system tracks.

3.5.5.7.6. By-pass function shall also allow displaying multiple individual sensors simultaneously.

3.5.5.7.7. Switch from/to By-pass mode to normal Mode shall not cause any ambiguity for Controller.

3.5.5.8. ATM Centre Hardware Configuration

3.5.5.8.1. ATM equipment will be installed in the existing space provided in the room at JKIA

3.5.5.8.2. The Bidder shall ensure that the Voice and surveillance Data Recordings are synchronized.

3.6. AIRSPACE MANAGEMENT.

3.6.1. Technical/ Operational requirements.

3.6.1.1.   The tenderer shall provide an Airspace Management (ASM) Support System complete with specification for the application of Flexible Use of Airspace (FUA), Air Traffic Flow Management (ATFM), Arrival/Departure Management (AMAN and DMAN) and Unmaned Aircraft System Management System (UTM).

3.6.1.2.   The activities to be supported by the system include creation of Functional Airspace Block (FAB), Free Route Airspace (FRA) and dynamic sectorization.

3.6.1.3.   The ASM support system shall support the fixed and dynamic route networks currently in place, as well as direct routings, FRA and flexible sector configurations.

3.6.1.4.   The system shall be able to respond to changing demands for airspace; Enhancements to the Network Operations Plan (NOP) shall be achieved through a collaborative decision-making process between all involved operational stakeholders;

3.6.1.5.   The system shall support cross-border activities, resulting in shared use of segregated airspace regardless of national boundaries. This includes:
   a) collection of long term airspace planning data, also referred to as strategic planning data.
   b) negotiation and consolidation of the airspace planning/reservation data.
   c) distribution of the airspace allocation plan for the notification to the users.
   d) Tactical activation and deactivation of the airspace structures.

3.6.1.6.   The System shall support the commonly agreed general ASM functions and procedures needed to apply and fully exploit the Concept of the FUA as described in the Airspace Management Handbook.

3.6.1.7.   The System should make use of COTS (Commercial of the shelve) hardware.

3.6.1.8.   The system shall use cryptographic protocols to ensure endpoint authorisation and communication privacy.

3.6.1.9.   The system shall be developed in line with state of the art human factors and human-machine interface principles.

3.6.1.10.   The system **shall** be adaptable to changes to the ASM organisation and procedures.

3.6.1.11.   The system shall accommodate agreed civil military coordination procedures.

3.6.1.12.   The system shall facilitate seamless application of the ASM/FUA processes at local level.

3.6.1.13.   The system shall automate (i.e. provides system supports) the FUA /ASM processes at local level. The processes include booking, sharing, negotiation, collaboration at local level, allocation, activation and deactivation of airspace structures and data collection.

3.6.1.14.   The system shall manage AMC manageable and NON AMC manageable airspace structures.

3.6.1.15.   The system **shall** include a mechanism and functionalities to negotiate and coordinate the airspace allocation at local level.

3.6.1.16.   The system shall record and collect and ensure availability of FUA / ASM data at national level for the purpose of performance measurement.

3.6.1.17.   The system shall support real-time, online functionalities, archiving of all recorded data ensuring common situational awareness at all times.

3.6.1.18.   The system shall support standard geodetic reference system and international standards for unit measurements for international aviation (ICAO).

3.6.1.19.   The system shall notify the users for system errors and deviations from the set rules.

3.6.1.20.   System shall enable the ATM service provider balance traffic flow within a specific airspace continuum so as to improve efficiency, effectiveness and systematic flow of traffic into an airspace and also in and out of airport.

3.6.1.21.   System to be able to integrate into the ATM software so as to access, analyse and display expected information from AIXM, WIXM, FIXM and surveillance data.

3.6.2.   **Functional Requirements**

3.6.2.1.   The system shall maintain up-to-date ASM static data. The ASM static data should be updated through import from the relevant DB.

3.6.2.2.   The system shall facilitate data integrity check to validate the ASM static data.

3.6.2.3. The system shall provide functionality to insert and configure, including creation and processing of geometric data, ad-hoc and not AIP published airspace structures and combine it with FUA ASM data.

3.6.2.4. The system shall register and authorize users' read/write access privileges. This includes provision of users' authentication.

3.6.2.5. The system shall display ARES and Event Schedules allowing long, medium and short term planning and providing functionality to create, edit and cancel events.

3.6.2.6. ARES shall contain the following information:

a)   Reference number (System generated)
b)   Start date / time.
c)   End date / time.
d)   Status (System generated in line with the ASM process).
e)   Flight levels (altitude).
f)   lower and upper .
g)   Service provider/responsible unit.
h)   Requestor / POC

3.6.2.7. The System may generate proposals for publication of NOTAM where ARES or airspace structure allocation requires a NOTAM publication

3.6.3.   Air Traffic Flow Management (ATFM).

3.6.3.1. The ATM system must have capability to perform ATFM. The purpose of the service is to guarantee a safe, orderly, and expeditious flow of air traffic by ensuring that Air Traffic Control (ATC) capacity is utilised to the maximum extent possible, and that the traffic volume is compatible with the capacities declared by the appropriate ATS

3.6.3.2. Flow Management Units (FMUs): System be able to analyse daily airport and airspace capacity determination on demand prediction using flight progress via manual input or automated data feed (e.g., ATM Automation System Flight Data Processor [FDP] or Aeronautical Fixed Telecommunications Network [AFTN]).

3.6.3.3. Capacity Management – System should be able to accept Inputs from Flow Management Position (FMP) and Flight Operation Centre [FOC] via ATFM web-based interface.

3.6.3.4. System should be able to assess effects of imbalance to traffic beyond capacity impact range, Stakeholder Colaborative

Decision Making (CDM) engagement, Model Flow programs and set hourly capacity and arrival slots to ensure demand/capacity balance.

3.6.3.5.　　System should be able to facilitate slot assignments which should be viewed via software web interface and notifications.

3.6.3.6.　　System should be able to Monitor effectiveness of ATFM measure and amend as required including providing daily post-operational analysis

3.6.4.　Arrival Manager (AMAN) – Functional Requirements

3.6.4.1.　**Prediction and Planning**

a)　　Flights shall be considered by AMAN as soon as they enter the operational area. The proposed operational area in this case is 90 NM.

b)　　Capable of performing pre-metering for flights during radar outage based on external data (FDPS etc.). This implies the need to configure the pre-metering area for this case.

c)　　AMAN shall automatically allocate a runway for each flight based on applicable local rules, PBN & conventional STARS including radar vectors.

d)　　The most prevailing criteria for the runway allocation shall be the threshold of current runway in use and beginning of the STAR, local procedure or radar vector.

e)　　Based on the runway, AMAN shall determine the corresponding arrival route. It shall be possible to configure different (alternative) arrival routes from the beginning of a STAR/ radar vector.

f)　　For route allocation, AMAN shall take flight plan attributes into account.

g)　　AMAN shall allow the configuration of holding patterns along the configured routes.

h)　　The routes shall be updated on every FPL update and on every manual route input via the AMAN HMI. The trajectories shall be updated on every route change and on the relevant monitoring events, such as the conformance monitoring.

i)　　AMAN shall derive all route structures from the current database in use.

j)　　AMAN shall provide functionality to enable the controller to manually change the route.

k) The AMAN shall calculate an Estimated Landing Time (ELDT) for each inbound flight based on a trajectory prediction. The ELDT time shall represent the earliest possible landing time assuming that no capacity constraints at the runway exist for each flight.

l) The trajectory prediction shall contain the estimated times over (ETOs) reference points and the Estimated Landing Time (ELDT) at the selected runway according to the current runway strategy and runway allocation rules.

3.6.4.2. Trajectory Prediction (TP) General Requirements

a) AMAN planning shall be based on a highly precise trajectory prediction that is capable to take airspace constraints, local procedures and aircraft performance data into account.

b) The trajectory prediction shall use of EUROCONTROL's Base of Aircraft Data (BADA) aircraft performance model (Version 3.7 or higher). The horizontal, altitude and speed profiles shall be calculated using the equations of motion given by the BADA model. This shall yield estimates and predictions for passing time, altitude and speed for all points of the trajectory.

c) Altitude and speed constraints that are required at specific waypoints according to FPL data (requested altitude, requested speed), ATC standard operating procedures (e.g. Letter of Agreement) and user input shall be considered.

d) The metering of waypoints along which the trajectory is calculated (horizontal profile) shall be constructed by the trajectory prediction using the preprocessed route data. If surveillance data (track data) are given, the horizontal profile shall start from the current position and shall use radar merge capabilities to identify the next waypoint in the route.

e) The trajectory prediction shall generate a vertical profile that takes altitude constraints and aircraft performance parameter into account.

f) The trajectory prediction shall generate a speed profile that takes speed constraints and aircraft performance parameter into account.

g) Monitoring features - like area, sector or waypoint passing events – shall be provided to trigger trajectory updates or event messages. It shall be possible to trigger an immediate trajectory update at any time.

h)   The trajectory prediction shall support parallel independent calculation of alternative trajectories ("What-if?" calculations) for different possible routes and operational procedures as well as different speed profile.

i)   The trajectory prediction shall support use of parallel independent runways in use and independent crossing runways based on local procedures.

3.6.4.3.   TP Configuration

a)   It shall be possible to define airspace volumes. A volume shall be defined by an area and an upper and lower flight level.

b)   It shall be possible to define airspace decompositions, which consist of a set of airspace volumes.

c)   It shall be possible to configure additional mappings of ICAO aircraft type codes to BADA aircraft models.

d)   It shall be possible to configure additional mappings of wake turbulence categories to BADA aircraft models.

e)   The trajectory prediction shall allow defining altitude and speed constraints for all points.

f)   It shall be possible to configure user defined speed limits for airspace volumes.

g)   It shall be possible to configure a meteorological grid that covers the complete airspace volumes configured in AMAN.

3.6.4.4. TP Route Merge

a)   For flights, which are currently not flying on pre-configured routes, the trajectory prediction shall be capable to predict trajectories that merge with the configured routes.

b)   The trajectory prediction shall provide at least three different merge modes to support the trajectory prediction taking into account the local operational procedures.

c)   It shall be possible to use subsequent radar positions to calculate turn rates as provided by the ATM system.

d)   Possibility of configuring the maximum deviation between current heading and direction to a waypoint and consider this value for the radar merge.

e)   Possibility of configuring one or more waypoints for which route merge is restricted as per the system configuration.

f) Possibility of configuring radar merge modes for defined airspace volumes.

3.6.4.5. Arrival Sequencing

a) AMAN shall have an offline configurable planning horizon (x minutes before ELDT), within which the automated sequencing of flights occurs.

b) AMAN shall perform a runway metering optimization to calculate Target Landing Time (TLDT), taking into account Estimated Landing Time (ELDT), separation constraints, and optimization criteria.

c) The AMAN shall consider minimum separations, depended on runway and wake turbulence categories.

d) AMAN shall support multiple runway operations. In case of runway dependencies, AMAN shall consider minimum separations for flights at these dependent runways.

e) The AMAN shall consider runway closure slots.

f) The AMAN shall be capable to manage the arrival flow for mixed-mode runway operations.

g) AMAN shall consider allocated arrival blocking slots before or after a particular flight.

h) AMAN shall be capable to classify flights (e.g. normal inbound flights, regional flights, VVIP flights, ambulance flights and military flights, etc.) to treat them differently in the AMAN meter.

i) AMAN shall allow assign a flight to priority, which is then prioritized in the metering.

j) AMAN shall allow the definition of a frozen sector/ airspace, within which the automatic metering changes are restricted and is only allowed to flights that are assigned priority.

3.6.4.6. Arrival Metering

a) AMAN shall calculate Target Times Over (TTO) metering fixes taking into account Target Landing Time (TLDT) and Trajectory Prediction."

b) AMAN shall calculate a Time to Gain / Time to Lose (TTG/TTL) advisory based on the difference between TLDT and ELDT.

c) The AMAN shall support automatic route changes, e.g. if the delay of a flight is above a certain threshold value.

d)   AMAN shall provide holding advices. AMAN shall provide functionality to consider manually inserted holding pattern.

e)   AMAN shall support an extended horizon to conduct sequencing in the en-route and early descent phases. Thereby, data exchange, data processing and information display at the relevant controller working positions (ENR, PLANNER, TWR-ARR sectors) to support the management of arriving TFC

f)   AMAN shall be capable to provide its metering results to external systems to enable integration of AMAN advices into the track label.

3.6.4.7.   Re-Planning and Metering Stabilization

a)   AMAN shall update its planning and metering (including flight related data and metering advices) triggered by external data updates (e.g. radar/trajectory data updates, flight plan changes) or manual user input.

b)   AMAN shall update planning in case of updated input data, runway direction change, and runway in use change or in case of adding or deleting a runway closure slot.

c)   AMAN shall provide functionality to stabilize the metering by limiting metering order changes and taking the number of metering order changes into account as an optimization criterion for metering.

3.6.5.   Departure Manager (DMAN) – Functional Requirements

3.6.5.1.   Prediction and Planning

a)   Flights shall be considered by DMAN based on a variable time as considered by ATC based on Target Off Block Time (TOBT) as provided by the airline/ operator. The proposed operational area to include end of SID.

b)   Other times to be included in the DMAN are Target Take off times, Startup times and taxi times.

c)   DMAN shall implement Variable Taxi Time (VTT) - linking off Block time and Take off time.

d)   DMAN shall improve departure flows at the airport by calculating the Target Take Off Time (TTOT) and Target Start up Approval Time (TSAT) for each flight taking multiple constraints and performance into consideration.

e)   Capable of perform pre-sequencing for flights during radar outage based on external data (FDPS etc.). This implies the need to configure the pre-sequence area for this case.

f)   DMAN shall automatically allocate a runway for each flight based on applicable local rules, PBN & conventional SIDS including radar vectors.

g)   The most prevailing criteria for the runway allocation shall be the threshold of current runway in use and beginning of the SID, local procedure or radar vector.

h)   Based on the runway, DMAN shall determine the corresponding departure route. It shall be possible to configure different (alternative) departure routes from the beginning of a SID/ radar vector.

i)   For route allocation, DMAN shall take flight plan attributes into account.

j)   DMAN shall allow the configuration of stands/ bays and holding points at the airport.

k)   The airport layout shall be updated as appropriate allowing manual input via the DMAN HMI. The trajectories shall be updated on every layout route change and on the relevant monitoring events, such as the conformance monitoring.

l)   DMAN shall derive all layout route structures from the current database in use/ or AIP.

m)   DMAN shall provide functionality to enable the controller to manually change the layout route.

n)   DMAN shall calculate a TTOT & TSAT for each departing flight based on a trajectory prediction. The TTOT time shall represent the earliest possible departing time assuming that no capacity constraints at the runway exist for each flight.

o)   The trajectory/path prediction shall contain the estimated Off Block Time (EOBT) reference points and the Estimated Take OFF Time (ETOT) at the selected runway according to the current runway strategy and runway allocation rules.

3.6.5.2. Trajectory Prediction (TP) General Requirements

a)   DMAN planning shall be based on a highly precise path prediction that is capable to take airspace constraints, local procedures and aircraft performance data into account.

b)   The trajectory/ path prediction shall use of EUROCONTROL's Base of Aircraft Data (BADA) aircraft performance model (Version 3.7 or higher). The horizontal, altitude and speed profiles shall be calculated using the equations of motion given by the BADA model.

This shall yield estimates and predictions for passing time, altitude and speed for all points of the trajectory.

c)   Time and speed constraints that are required at specific points according to airport layout, local operating procedures (e.g. Letter of Agreement) and user input shall be considered.

d)   The sequence of points along which the path is calculated shall be constructed by the trajectory/ path prediction using the preprocessed airport layout data. If surveillance data (track data) are given, the profile shall start from the current position and shall use radar/ SMGCS merge capabilities to identify the next point in the trajectory/ path.

e)   The trajectory/ path prediction shall generate a profile that takes time constraints and aircraft performance parameter into account.

f)   The trajectory/ path prediction shall generate a speed profile that takes speed constraints and aircraft performance parameter into account.

g)   Monitoring features - like area, sector or waypoint passing events – shall be provided to trigger trajectory/ path updates or event messages. It shall be possible to trigger an immediate trajectory/ path update at any time.

h)   The trajectory/ path prediction shall support parallel independent calculation of alternative trajectory/ paths ("What-if?" calculations) for different possible routes and operational procedures as well as different speed profile.

i)   The trajectory/ path prediction shall support use of parallel independent runways in use and independent crossing runways based on local procedures.

3.6.5.3.   TP Configuration

a)   It shall be possible to define airspace volumes. A volume shall be defined by an area and an upper and lower flight level.

b)   It shall be possible to define airspace decompositions, which consist of a set of airspace volumes.

c)   It shall be possible to configure additional mappings of ICAO aircraft type codes to BADA aircraft models.

d)   It shall be possible to configure additional mappings of wake turbulence categories to BADA aircraft models.

e)　　　　The trajectory prediction shall allow defining altitude and speed constraints for all points.

f)　　　　It shall be possible to configure user defined speed limits for airspace volumes.

g)　　　　It shall be possible to configure a meteorological grid that covers the complete airport layout configured in DMAN.

3.6.5.4.　　TP Route Merge

a)　　　　For flights, which are currently not taxing on pre-configured trajectory/ path, the trajectory/ path prediction shall be capable to predict trajectory/ paths that merge with the configured trajectory/ paths.

b)　　　　The trajectory/ path prediction shall provide at least three different merge modes to support the trajectory/ path prediction taking into account the local operational procedures.

c)　　　　It shall be possible to use subsequent radar/SMGCS positions to calculate determine and calculate positions.

d)　　　　Possibility of configuring one or more points for which trajectory/ path merge is restricted as per the system configuration.

e)　　　　Possibility of configuring radar/ SMCGS merge modes for defined airspace volumes.

3.6.5.5.　　Departure Sequencing

a)　　　　DMAN shall have an offline configurable planning horizon (x minutes before EOBT), within which the automated sequencing of flights occurs.

b)　　　　DMAN shall perform a runway sequence optimization to calculate TTOT taking into account EOBT spacing constraints, and optimization criteria.

c)　　　　The DMAN shall consider minimum time separations, depended on runway and wake turbulence categories.

d)　　　　DMAN shall support multiple runway operations. In case of runway dependencies, DMAN shall consider minimum separations for flights at these dependent runways.

e)　　　　The DMAN shall consider runway closure slots.

f)　　　　The DMAN shall be capable to manage the departure flow for mixed-mode runway operations.

g) DMAN shall consider allocated departure blocking slots before or after a particular flight.

h) DMAN shall be capable to classify flights (e.g. normal inbound flights, regional flights, VVIP flights, ambulance flights and military flights, etc.) to treat them differently in the DMAN sequence.

i) DMAN shall allow assign a flight to priority, which is then prioritized in the sequence.

j) DMAN shall allow the definition of a frozen sector/ airspace/ taxiway/ runway, within which the automatic sequence changes are restricted and is only allowed to flights that are assigned priority.

3.6.5.6. Departure Metering

a) DMAN shall calculate VTT sequencing fixes taking into account TTOT and Trajectory/path Prediction.

b) DMAN shall calculate a Time to Gain / Time to Lose (TTG/TTL) advisory based on the difference between TTOT and EOBT.

c) The DMAN shall support automatic route/path changes, e.g. if the delay of a flight is above a certain threshold value.

d) DMAN shall provide holding advices. DMAN shall provide functionality to consider manually inserted holding points.

e) DMAN shall support an extended horizon to conduct sequencing. Thereby, data exchange, data processing and information display at the relevant controller working positions (ENR, PLANNER, TWR-ARR sectors) to support the management of departing TFC.

f) DMAN shall be capable to provide its sequencing results to external systems to enable integration of DMAN advices into the track label in the SMGCS/ ATM system.

3.6.5.7. Re-Planning and Sequence Stabilization

a) DMAN shall update its planning and sequencing (including flight related data, sequence advices) triggered by external data updates (e.g. radar/trajectory data updates, flight plan changes/ SMGCS) or manual user input.

b) DMAN shall update planning in case of updated input data, runway direction change, runway in use change or in case of adding or deleting a runway closure slots

3.6.6. **DMAN/AMAN HMI –(integrated into the controller PPI with functionality being availed in the same keyboard)**

a) HMI shall allow defining different user roles that allow various level of access, including read access, change access, and configuration access.

b) HMI shall provide pre-configurable and user-dependent screen layouts.

c) HMI shall provide user-friendly and easy to manage pull-down and pop-up menus.

d) HMI shall provide Runway Timelines for each runway (or a group of runways), which presents flight strips for arrivals/ departures. Runway name(s) shall be indicated at the timeline.

e) HMI shall provide Timelines for sequencing & Metering fixes (or a group of runways), which present flight strips for departure & arrivals. Sequencing & Metering fix name(s) shall be indicated at the timeline.

f) HMI shall display pre-configurable data at the timelines (dependent on user roles). Data to be available must at least include:
   i. Call sign (and/or flight number),
   ii. Aircraft type,
   iii. Wake turbulence category (WTC),
   iv. TTOT, TSAT, VTT, TLDT, TTO(s),
   v. Runway,
   vi. STAR/ SID
   vii. TTL/TTG.

g) HMI shall provide a Flight Info Window, indicating also EOBT, ATOT ELDTs and ETOs of each flight.

h) HMI shall support manual sequence & metering changes by "drag & drop" functionality. Planning shall be updated accordingly.

i) HMI shall allow authorized users to manually set/release priority of a flight.

j) HMI shall allow authorized users to manually set a minimum spacing before or after a particular flight.

k) HMI shall allow authorized users to manually assign a runway to a particular flight.

l) HMI shall provide functionality to change minimum departure/ arrival spacing.

m)   HMI shall provide functionality to change departure/ arrival flow rates. It shall be possible to select the number of departure/arrivals and the related time interval.

n)   HMI shall allow authorized users to add a runway closure slot. It shall be possible to select a start and an end time.

o)   HMI shall allow authorized users to change the runway strategy at a selectable time. Runway strategy change time shall be indicated in the runway timeline.

p)   HMI shall allow authorized users to manually insert a holding point/pattern.

q)   HMI shall support users to distinguish flights according to FPL attributes or allocated runway by color-coding.

3.6.6.1.   TP Speed Profile Calculation

a)   For trajectory/ path segments, for which no speed constraints are given, the most economical speed profile as given by the performance model and the aircraft type dependent parameters shall be used.(Generally derived taxi speeds should be used in this case)

b)   The trajectory/ path prediction shall be capable to calculate minimum and maximum speed profiles to calculate the maximum time to lose and time to gain on a given route without holding.

c)   The trajectory/ path prediction shall be capable to calculate an advisory profile. The advisory profile shall be used to calculate a speed advisory that enables the flights to meet a given target time over a fix/ point. The advised speed shall be checked against the flight envelope as given by the performance model.

d)   The calculation of the atmospheric density and the pressure and the speed conversion TAS-Mach and TAS-CAS shall be made using the ISA (International Standard Atmosphere) model. In order to allow an adaptation of the local weather at a given site, it shall be possible to configure a correction for the temperature at sea level.

3.6.6.2.   TP Consideration of Wind Data –integration with AWOS

a)   The trajectory prediction shall periodically check, whether it has loaded the most recent wind data. This implies integration with the AWOS.

b)   The trajectory prediction shall be capable to use wind vectors at the vertices of a three dimensional grid for the trajectory

prediction. The parameters of this grid shall be configurable/integrated to the AWOS.

c)   The trajectory prediction shall provide a GRIB wind converter. If no meteorological files are found or it has an invalid format, the trajectory prediction shall switch to a configured default wind.

d)   It shall be possible to configure the default wind (for JKIA runways- taking into consideration availability of parallel runway, Wilson runways and Eastlight runways).

e)   Each meteorological area shall contain multiple layer structure, with each structure containing the wind (including direction and speed) for an individual altitude band.

3.6.6.3.   TP Vertical Profile Calculation

a)   The trajectory prediction shall take into consideration the vertical restrictions associated with each STAR/SID and local procedures applicable.

b)   The following rules shall be applied for flight profile calculation within each segment:

i.   Within segments, which connect altitude constrained point during climb, the climb shall be performed as soon as possible.

ii.   Within segments, which connect altitude constrained point during descent, the descent shall be performed as late as possible.

iii.   The segment, which connects the last altitude constrained point within the climb phase with the first altitude constrained point within the descent phase, shall contain a climb phase, a cruise phase and a descent phase.

c)   The cruise altitude for flights shall be selected according to the following rules:

i.   If a requested or cleared flight level is given, the cruise altitude shall be selected accordingly.

ii.   If no requested or cleared flight level is given, the cruise altitude shall be calculated as the maximum altitude for the type of aircraft (given by the maximum altitude that allows a residual climb rate of 300 fpm for maximum aircraft mass).

iii.   However, if the above does not allow a cruise segment with a configurable minimum percentage of the segment, the maximum altitude that allows so shall be calculated and selected.

d)   The trajectory prediction shall allow the configuration of different climb and descent profiles.

e)   Each meteorological area shall contain multiple layer structure, with each structure containing the wind (including direction and speed) for an individual altitude band.

3.6.6.4.   **TP Conformance Monitoring**

a)   The trajectory prediction shall include a conformance monitoring that compares the current situation of a flight (position, altitude, time and speed) with the predicted trajectory.

b)   The conformance monitoring parameter shall include the following:

    i.   The "distance threshold" parameter shall define a threshold for the transversal conformance monitoring to perform the check of the distance between current radar position and the predicted trajectory.

    ii.   The "time threshold" parameter shall define a threshold for the longitudinal conformance monitoring to perform a check for the time relating to current track time (radar position) and the predicted time on trajectory.

    iii.   The "speed threshold" parameter shall define a threshold for the conformance monitoring relating to the ground speed to perform a check for the speed deviation (current ground speed of track and the predicted ground speed).

    iv.   The "altitude threshold" parameter shall define a threshold for the conformance monitoring relating to the altitude to perform a check for the altitude deviation (current altitude of track and the predicted altitude on trajectory).

c)   It shall be possible to set the conformance monitoring parameter individually for the configured airspace decompositions.

d)   If a check of the conformance monitoring detects a deviation greater than the given thresholds a conformance monitoring event shall be triggered. Conformance monitoring events shall include trajectory updates and alerts.

e)   The trajectory prediction shall determine the speed and rate of climb or descent from radar information.

f)   The trajectory prediction shall allow to trigger event notifications, e.g. if a flight passes a certain point or sector boundary.

g)   AMAN/DMAN shall automatically detect if a flight enters a holding pattern/point.

h)   HMI timelines shall provide functionality to apply color-coding based on flight plan data (i.e. Reference Fix).

i)   HMI shall provide "What-If" context windows.

Unmanned Aircraft System Traffic Management (UTM):

The ATM system must have capability to perform UTM; KCAA has expressed interest in implementing UTM to provide services for UAS operations, particularly in a mixed environment. This will facilitate harmonization of airspace use and ensure safety and efficiency without disrupting the existing manned aviation system. The UTM system should include:

a. **A registration system**: from which data is accessible in real time to allow remote identification and tracking of each UA, its operator/owner and location of the remote pilot/control station.

b. **Communications systems:** for control of the UA and for tracking all UA within the UTM area (as described by KCAA).The communications system used for tracking UA must be able to identify when a manned aircraft is entering UTM airspace and provide an acceptable level of protection between it and UA operating in the airspace. In addition it must facilitate detection of potential collisions with other UA and with obstacles such that appropriate avoidance action can be taken; and

c. **Geofencing-like systems**: that will support automatic updates by national authorities on the 28 day aeronautical information cycle (AIRAC) to prevent UA operation in sensitive security areas and restricted, prohibited and danger e.g, near aerodromes.

3.7. **TRAINING:**

3.7.1. General

3.7.1.1.   The supplier shall provide a training plan and course syllabus for approval by KCAA covering training for technical and operational staff.

3.7.1.2.   There shall be a factory training course(s) that will be held before FAT and on-site training for personnel to be conducted on site before SAT.

3.7.1.3.   The training shall consist of theoretical and practical training and shall be provided in the English language. The instructor should be a subject matter expert and be proficient in the English language. Credentials of the instructor should be forwarded to KCAA in advance for concurrence.

3.7.1.4.   The contractor to give the prerequisites of the trainees for each training course.

3.7.1.5.   The contractor shall provide a training syllabus detailing all the course content which shall be submitted to KCAA for approval four (4) weeks before the commencement of the training.

3.7.1.6.   The contractor shall issue the trainees with certificates upon successful completion of the training.

3.7.1.7.   A trainee shall be considered as competent upon passing both practical and theoretical exams.

3.7.1.8. After completion of each course the following reports shall be provided to the employer: each trainee performance, an attendance report, a summary report for each examination and certificate of competence for each trainee who successfully completed the course.

3.7.1.9. For training and FAT at the supplier premises, all training and FAT costs shall include the cost of airfare to and from Nairobi, Kenya (economy class) travel medical insurance and terminal transportation (airport to hotel and return) and DSA based on the Purchaser's standard rate. The supplier shall pay-out said DSA to the beneficiaries. For the moment, the standard daily DSA rate is USD 400.

3.7.2. **Technical Training Plan**

3.7.2.1. The level of training for technical personnel required should be as comprehensive as possible to allow them resolve faults by following the correct chronology, adequate methods and analyse the system.

3.7.2.2. They should also be able to resolve complex faults and minor modifications under Factory guidance.

3.7.2.3. For the ATM System the training should cover the following areas:

a) Main principles of ATM system architecture
b) Approaches to redundancy
c) Adaptation parameters of ATM system (configuration methodologies)
d) Hardware of ATM system
e) Software of ATM system
f) Software installation and update
g) Main principles of surveillance
h) Tracker Algorithms of multi-sensor data processing
i) Flight data Information
j) Safety Nets
k) ATM data presentation at the CWP

3.7.2.4. The number of technical officers and the duration of the training period for each of the equipment is as tabulated below:

	Activity	
Number of Officers	Factory Training	04
	FAT	02
	Site Training	06
Training Duration (Days)	Factory Training	15
	FAT	5
	Site Training	20

3.7.3. **Operational Training**

3.7.3.1. The contractor shall provide introductory training course to give ATCOs an overall knowledge of the system.

3.7.3.2. For the ATM System the training should at least cover the following areas:

      a) Main principles of ATM system architecture
      b) Adaptation parameters of ATM system (configuration methodologies)
      c) Flight Data Information
      d) Safety Nets
      e) ATM data presentation at the CWP
      f) Simulation.

3.7.3.3. The number of operational officers and the duration of the training period for each of the equipment is as tabulated below.

No	Activity	ATM System
1	Factory Training	04
	FAT	02
	Site Training	08
2	Factory Training	15
	FAT	5
	Site Training	20

3.8. FACTORY ACCEPTANCE TESTING (FAT)

3.8.1. Factory Acceptance Testing shall be carried out before the contractor ships the system to KCAA premises.

3.8.2. FAT shall be carried out at contractor's premises/factory in the country of origin. The FAT shall be immediately after the factory training.

3.8.3. The contractor shall send the FAT Test Plan, which shall include in part, the tests to be carried out and the method to be used to KCAA 4 weeks in advance for purposes of evaluation. Upon approval, KCAA shall inform the contractor the suitability of the FAT tests in writing. Should problems materialize during the FAT or should the FAT result be deemed unsatisfactory by KCAA, the problems shall be corrected and the status be mutually verified and agreed during SAT.

3.8.4. FAT shall comprise of testing all the components of the system, including all the spare parts. All the tested components shall be recorded prior to shipping to KCAA premises.

3.8.5. The contractor shall issue a FAT Certificate after successful FAT testing, duly signed by both contractor and KCAA.

3.9. SITE ACCEPTANCE TESTS

3.9.1.   A Site Acceptance Test shall be carried out on site where the system will be installed.

3.9.2.   All components of the system shall be tested during SAT. A Test Record shall be completed. Every recording, listing, print out created during the SAT shall be added to the test report as evidence. Should problems materialize during the SAT or should the SAT result be deemed unsatisfactory by KCAA, the problems shall be corrected and the status be mutually verified and agreed.

3.9.3.   The contractor shall submit to KCAA the SAT Test Plan, which shall include in part, the tests to be carried out and the method to be used to KCAA 2 weeks in advance for purposes of evaluation. Upon approval, KCAA shall inform the contractor the suitability of the FAT tests in writing.

3.9.4.   The contractor shall issue a SAT Certificate after successful SAT testing, duly signed by both contractor and KCAA.

3.10.   SPARE PARTS

3.10.1.   The spares to be supplied shall be of the same quality as the originally installed parts, and equipment.

3.10.2.   The spares shall be supplied in their original packaging, duly protected against moisture by dehydrating elements or silicon. Each set of spares shall be labelled with its part number, identification and number of units contained in each package.

3.10.3.   The spares shall be tested in factory before shipment on site.

3.10.4.   Tenderer shall guarantee the ability to furnish spare parts or to repair the equipment under offer for a period of at least ten (10) years after end of warranty.

3.10.5.   To supply one (1) unit of all the modules/cards/items utilized by the equipment specified above. Provide a list of the spares indicating cost of each. The cost is to be firm for three years. The list to include recommended numbers of consumable spares e.g. fuses, relays e.t.c

3.11.   TOOLS AND TEST EQUIPMENT

3.11.1.   The Tenderer shall supply a Tools and Test Equipment list. The Contractor shall provide a minimum of one (1) set of tools and test equipment, to perform preventive and corrective maintenance.

3.11.2.   All the above equipment shall be accompanied by the pertinent information necessary for its operation and maintenance.

3.11.3.   The original copy of the commercial software and the original licence shall be supplied.

3.11.4.   Detailed installation procedures shall be supplied for commercial and specific software in order to allow an installation from scratch.

3.12.   DOCUMENTATION

This chapter gives detailed information of the documentation required for, technical system operation, operational use, preventive and corrective maintenance and data sheets of the systems.

3.12.1.   The documentation shall:
- Be written in English language,
- Present information in a clear and logical manner,
- Contain drawings,
- Contain glossaries and abbreviations.

3.12.2.   All documentation shall be delivered both in printed form and as computer readable files.

3.12.3.   The documentation shall consist at least of the following parts:
a.   System specifications documentation
b.   Interface control documentation
c.   Operator handbook documentation
d.   Installation documentation
e.   Maintenance documentation

3.12.4.   The documentation shall be separate for each system.

3.12.5.   The contractor shall supply the documentation per system, as follows:

3.12.6.   Three (3) paper copy set

3.12.7.   Three (3) electronic copy on CD in commercial format (Word, Excel, PDF etc.)

3.12.8.   The Contractor shall provide complete information on the electrical interconnections at the equipment level distribution.

3.12.9.   The technical manuals shall cover, as a minimum, the following subjects:

3.12.10. Theory of operation including, block diagrams, schematic drawings.

3.12.11. Installation procedures including all electrical cabling and interconnections.

3.12.12. Maintenance and troubleshooting procedures.

3.12.13. List of spares with part numbers so that future replacement of any particular component can be quickly achieved.

3.12.14. All manuals shall be current editions including any amendment applicable up to date of delivery.

3.13. WARRANTY AND POST WARRANTY

3.13.1. The Warranty Period will be three (3) years after successful commissioning of the system. Commissioning here means putting into operation the entire system at JKIA.

3.13.2. The contractor shall replace or repair any items that fail during the warranty period at no additional cost. All the costs of such components, including transportation, duties and taxes shall be borne by the contractor.

3.13.3. Any item that fails during the warranty period and shipped to the factory shall have a turnaround period of not more than forty five (45) days.

3.13.4. The contractor shall give a commitment in writing, that all system components (as spare parts) shall be available 10 years after the end of the warranty period.

3.13.5. The contractor shall submit a proposal for the system support and

maintenance in the installed sites for a period of 5 years after expiry of the warranty. KCAA is however not bound to accept the proposal.

3.14. SCHEDULE OF SUPPLY

List of Goods and Delivery Schedule

Line Item N°	Description of Goods	Quantity	Physical unit	Final (Project Site) Destination as specified in BDS	Delivery (as per Incoterms) Date		
					Earliest Delivery Date (days)	Latest Delivery Date (days)	Bidder's offered Delivery date [to be provided by the Bidder]
1	Complete ATM System for JKIA.	1	Lot	JKIA	120	240	
2	Supply of assorted spares	1	Lot	JKIA	120	240	

OTHER KEY REQUIREMENTS

- The Recorders should have enough capacity to record and save data for a minimum of six months and the system be able to archive data to any external media when required. Replay should be done from both the recorders and the archived external media.
- The ATM system should be able to receive and use external time sources. It should synchronize time.
- The ATM system should be able to connect with both serial and IP input sources.
- The main operating characteristics/capabilities of the system should include
  - ✓ A System Area size of 1024 NM x 1024 NM.
  - ✓ 800 Mono-Radar Tracks processed by RFP Area.
  - ✓ 700 Multi-Radar Tracks at RDP Output.
  - ✓ 1000 Flight Plans (Maximum).
  - ✓ 50 Sectors (Maximum).
  - ✓ 1000 Tracks processed by a Radar Controller Position.

- Technical monitoring and control should be able to monitor the entire ATM system components i.e. all the positions, servers, all external interfaces, network on real-time bases and display the status. It should have an advanced user-friendly interface.

EVALUATION CRITERIA

Kenya Civil Aviation Authority will consider the following three stages to evaluate the tender as follows.

a) Mandatory tender requirements
b) Technical evaluation on system specifications and the bidders capacity to deliver the contract
c) Financial Evaluation.
d) Due diligence

(a)   MANDATORY TENDER REQUIREMENTS

The submission of the following mandatory items will be required in the determination of the completeness of the bid and responsiveness of bidders. Bids that do not contain all the information required will be declared non responsive and shall not be evaluated further.

No.	Documents to be submitted
1.	**Ineligibility:** - Bidders and associated firms who have existing ongoing contracts with KCAA which have delayed beyond the original scheduled completion period in the contract or having none performing records or terminated contracts are not eligible to participate.
2.	**Project commitment/implementation plan –** Bidders MUST attach sample project plan/work program clearly indicating the expected completion date of the project (provide details).
3.	Provide documentary evidence of the company's registration details /certificate of incorporation
4.	Provide copy of the company Valid Tax Compliance certificate
5.	Copy of CR12 certificate or legal documents that shows the company shareholders
6.	Attach a copy of respective county government business permit **(Applicable to Local bidders Only)**
7.	Provide a tender Security of **KES 2,500,000.00** in the format indicated in the appendix to instructions to tenderers valid for 180 days from the date of tender opening.
8.	The bidder shall provide two paginated hard copies marked **Original** and **Copy** and a **soft copy**.
9.	Provide a duly filled and signed Form of Tender
10.	Written power of attorney of the signatory of the tender to commit the tenderer.
11.	Validity of bid tender, for a period of 150 days
12.	Duly signed sworn Anti-corruption affidavit signed by commissioner of oaths
13.	**Experience** • The Bidders MUST have previous experience in the supply and installation Air Traffic Management System in 3 countries outside the state of manufacture of the ATM system each with a value is **Kshs. 150 million** and above. • Provide recommendation letters and corresponding copies contracts and Certificate of Completion from the stated projects. The letters must be on the letter heads of the respective client and include names, addresses, email and telephone contacts of the 3 companies who may be contacted for further information on these projects.
14.	**Financial Resources** The bidders shall submit the latest three years audited financial statements.

No.	Documents to be submitted
15.	Bidders MUST have an annual turnover of at least **Kshs 300 million** for each of the last three years.
16.	Submit evidence that your firm will be able to raise capital of **Kshs 200 Million** for the project.
17.	Attach detailed technical brochures for system and all equipment under this project
18.	**Spares** The supplier shall provide a list of all critical system spares, a written confirmation of the availability of the spares to be supplied and their respective cost which will remain valid for three years after the three (3) years warranty period. The price for this additional spares to be provided separately and will not be included in the cost of the project.
19.	Ensure serialization of all pages of the bid submitted
20.	Submit a statement in the bidders letter head that the company is not insolvent, receivership, bankrupt or in the process of being wound up
21.	Submit a statement in the bidder's letter head indicating that the person or his or her sub-contractor, if any is not debarred from participating in procurement proceedings.
22.	Submit a statement in the bidder's letter head indicating that the person participating in procurement proceedings has not been convicted of corrupt or fraudulent practices
23.	Warranty 3 years post-commissioning with applicable costs
24.	Provide a manufacturer authorization certificate

b) Technical Evaluation

Bidders will be expected to meet **ALL** the technical requirements as per the technical specifications provided in this tender document for Supply, Delivery, Installation and Commissioning of An Air Traffic Management System at Jomo Kenyatta International Airport. Bidders **MUST** attach all the technical brochures for **ALL** the components of the proposed system, failure to which the bid will be declared non responsive.

Bidders are further advised to attach a compliance checklist for all the specifications for the ATM system.

C) FINANCIAL EVALUATION CRITERIA

Financial evaluation shall be conducted for the bidder who will have passed the technical evaluation as outlined in (b) above.

The financial evaluation will include checking for arithmetic errors where necessary and shall take into account any financial discounts stated in the bid document. The winning bidder will be the lowest evaluated bidder.

(D) DUE DILIGENCE

KCAA shall conduct a due diligence to confirm and verify the qualifications and authenticity of information given of the tenderer who submitted the lowest evaluated responsive tender to be awarded the contract in accordance with PPADA 2015.

SECTION VII - STANDARD FORMS

Notes on standard forms

1. The tenderer shall complete and submit with its tender the form of tender and price schedules pursuant to instructions to tenderers clause 9 and in accordance with the requirements included in the special conditions of contract.

2. When requested by the appendix to the instructions to tenderers, the tenderer should provide the tender security, either in the form included herein or in another form acceptable to the KCAA pursuant to instructions to tenderers clause 12.3

3. The contract form, the price schedules and the schedule of requirements shall be deemed to form part of the contract and should be modified accordingly at the time of contract award to incorporate corrections or modifications agreed by the tenderer and the KCAA in accordance with the instructions to tenderers or general conditions of contract.

4. The performance security and bank guarantee for advance payment forms should not be completed by the tenderers at the time of tender preparation. Only the successful tenderer will be required to provide performance/entity and bank guarantee for advance payment forms in accordance with the forms indicated herein or in another form acceptable to the KCAA and pursuant to the – conditions of contract.

5. The principal's or manufacturer's authorization form should be completed by the principal or the manufacturer, as appropriate in accordance with the tender documents.

FORM OF TENDER

Date_____

Tender No. KCAA/008/2019-2020

To: Kenya Civil Aviation Authority
    P.O BOX 30163-00100, Nairobi

Gentlemen and/or Ladies:

Gentlemen and/or Ladies:

1. Having examined the tender documents including Addenda Nos……………………….…….. *[insert numbers)* of which is hereby duly acknowledged, we the undersigned, offer to **Supply, Delivery, Installation and Commissioning of an Air Traffic Management System at Jomo Kenyatta International Airport** in conformity with the said tender documents for the sum of ………………………………………………………………………………………..……. …………………………………………….. *[total tender amount in words and figures]* or such other sums as may be ascertained in accordance with the Schedule of Prices attached herewith and made part of this Tender.

2. We undertake, if our Tender is accepted, to supply the Voice Communications and Control Systems for Jomo Kenyatta and Moi International Airports for the Authority in accordance with the schedule specified in the Schedule of Requirements.

3. If our Tender is accepted, we will obtain the tender guarantee in a sum equivalent to _____ percent of the Contract Price for the due performance of the Contract, in the form prescribed by (Procuring entity).

4. We agree to abide by this Tender for a period of ……………………*[number]* days from the date fixed for tender opening of the Instructions to tenderers, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

5. Until a formal Contract is prepared and executed, this Tender, together with your written acceptance thereof and your notification of award, shall constitute a binding Contract between us.

    Dated this _____ day of_____ 2020

    [signature]   *[In the capacity of]*

    duly authorized to sign tender for and on behalf of

    _____

PRICE SCHEDULE FORM

TENDER NUMBER: KCAA/008/2019-2020

TITLE OF TENDER: SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF AN AIR TRAFFIC MANAGEMENT SYSTEM AT JOMO KENYATTA INTERNATIONAL AIRPORT.

NAME OF TENDERER: --

Line Item N°	Description of Goods	Quantity	Physical unit	AMOUNT
1	Supply, delivery, installation and commissioning of a Complete ATM System comprising JKIA	1	Lot	
2	Supply of assorted spares	1	Lot	
TOTAL PRICE OF THE SYSTEM INCLUSIVE OF ALL APPLICABLE TAXES TO BE TRANSFERRED TO FORM OF TENDER				

Note:

- ➢ **All prices quoted shall be inclusive of all applicable taxes (DDP 2010). Bidders should confirm with the applicable taxes for their countries. KCAA will not be liable for erroneous tax computation or under provision.**
- ➢ **Bidders MUST provide a detailed breakdown of all the costs clearly indicating the services and the goods to be provided.**
- ➢ **Bidders MUST provide a detailed price schedule to support the prices above.**

Authorized Official

Name _____

Signature_____

Date and official stamp   _____

CONTRACT FORM

THIS AGREEMENT made the ___day of _____20____between………… [name of procurement entity] of ………………[country of Procurement entity](hereinafter called "the KCAA") of the one part and …………………[name of tenderer] of ……….[city and country of tenderer](hereinafter called "the tenderer") of the other part.

WHEREAS the KCAA invited tenders for certain materials and spares. Viz……………………..[brief description of materials and spares] and has accepted a tender by the tenderer for the supply of those materials and spares in the spares in the sum of …………………………………………[contract price in words and figures]NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz.:

>   (a) the Tender Form and the Price Schedule submitted by the tenderer;
>   (b) the Schedule of Requirements;
>   (c) the Technical Specifications;
>   (d) the General Conditions of Contract;
>   (e) the Special Conditions of Contract; and
>   (f) the KCAA's Notification of Award.

3. In consideration of the payments to be made by the KCAA to the tenderer as hereinafter mentioned, the tenderer hereby covenants with the KCAA to provide the materials and spares and to remedy defects therein in conformity in all respects with the provisions of the Contract
4. The KCAA hereby covenants to pay the tenderer in consideration of the provision of the materials and spares and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the contract at the times and in the manner prescribed by the contract.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in
accordance with their respective laws the day and year first above written.

Signed, sealed, delivered by_____the _____(for the KCAA)

Signed, sealed, delivered by_____the _____(for the tenderer)

in the presence of_____.

CONFIDENTIAL BUSINESS QUESTIONNAIRE FORM

You are requested to give the particulars indicated in Part 1 and either Part 2 (a), 2(b) or 2(c) whichever applied to your type of business.

You are advised that it is a serious offence to give false information on this form.

Part 1 General

Business Name ....…

Location of Business Premises ....……
Plot No,... Street/Road
.... ……….
Postal address ....Tel No. ....Fax Email
....……
Nature of Business
Registration Certificate No. ....…
Maximum value of business which you can handle at any one time – Kshs...........................……
Name of your bankers ....……
Branch ....……

	Part 2 (a) – Sole Proprietor
	Your name in full.............................Age...
	Nationality...............................Country of Origin...
	Citizenship details ....
	Part 2 (b) – Partnership
	Given details of partners as follows
	Name Nationality Citizenship details
	Shares
	1. ....
	2. ....
	3. ....
	Part 2 (c) – Registered Company
	Private or Public: ....
	State the nominal and issued capital of company
	Nominal Kshs.. ....
	Issued Kshs…………………………………………………………..
	Given details of all directors as follows
	Name Nationality Citizenship details
	Shares
	1. ....
	2. ....
	3. ....
	4. ....
	Date...Signature of Candidate...........................

TENDER SECURITY FORM

Whereas …………………………………..[name of the tenderer] (hereinafter called "the tenderer")has submitted its tender dated………………..[date of submission of tender] for the provision of …………………………………………..

[Name and/or description of the services]

(Hereinafter called "the Tenderer")…………………………………………………..

KNOW ALL PEOPLE by these presents that WE…………………………………………

Of……………………………………………having registered office at……………………

[name of location](hereinafter called "the Bank")are bound unto………………

[name of KCAA](hereinafter called "the KCAA") in the sum of ………..

for which payment well and truly to be made to the said KCAA, the Bank binds itself, its successors, and assigns by these presents. Sealed with the Common Seal of the said Bank this_____ day of 20_____.

THE   CONDITIONS   of   this   obligation   are:
1. If the tenderer withdraws its Tender during the period of tender validity specified by   the   tenderer   on   the   Tender   Form;   or
2. If the tenderer, having been notified of the acceptance of its Tender by the KCAA during the period of tender validity:

>   (a) fails or refuses to execute the Contract Form, if required; or
>   (b) fails or refuses to furnish the performance security, in accordance with the instructions to tenderers;

we undertake to pay to the KCAA up to the above amount upon receipt of its first written demand, without the KCAA having to substantiate its demand, provided that in its demand the KCAA will note that the arnount claimed by it is due to it, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or   conditions.
This guarantee will remain in force up to and including thirty (30) days after the period of tender validity, and any demand in respect thereof should reach the Bank not later than   the   above   date.   _____
[signature of the bank]   ((*Amend accordingly if provided by Insurance Company*)

PERFORMANCE SECURITY FORM

To: ....

[name of the KCAA]

WHEREAS.................................... [Name of tenderer] (hereinafter called "the tenderer") has undertaken, in pursuance of Contract No._____[reference number of the contract] dated _____20_____to

Supply...

[Description services](Hereinafter called "the contract")

AND WHEREAS it bas been stipulated by you in the said Contract that the tenderer shall furnish you with *a* bank guarantee by a reputable bank for the sum specified therein as security for compliance with the Tenderer's performance obligations in accordance with the Contract.

AND WHEREAS we have agreed to give the tenderer a guarantee:

THEREFORE WE hereby affirm that we are Guarantors and responsible to you, on behalf of the tenderer, up to a total of .... *[amount of the guarantee in words and figures]*,

and we undertake to pay you, upon your first written demand declaring the tenderer to be in default under the Contract and without cavil or argument, any sum or sums within   the   limits   of   .... *[amount of guarantee]*as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This guarantee is valid until the _____ day of 20
_____
Signature and seal of the Guarantors

_____

[name of bank or financial institution]

_____

[address]

_____

[date]   *(Amend accordingly if provided by Insurance Company)*

BANK GUARANTEE FOR ADVANCE PAYMENT

To…………………………

[name of tender]…………………………………….

Gentlemen and/or Ladies:

In accordance with the payment provision included in the special conditions of contract, which amends the general conditions of contract to provide for advance payment,

…………………………………………………………….

[name and address of tenderer][hereinafter called "the tenderer"] shall deposit with the KCAA a bank guarantee to guarantee its proper and faithful performance under the said clause of the contract in an amount
of ……………………………………………………………………………………
[amount of guarantee in figures and words].
We, the …………………………………………………………………………

[bank or financial institution], as instructed by the tenderer, agree unconditionally and irrevocably to guarantee as primary obligator and not as surety merely, the payment to the KCAA on its first demand without whatsoever right of objection on our part and without its first claim to the tenderer, in the amount not exceeding
[amount of guarantee in figures and words].

We further agree that no change or addition to or other modification of the terms of the Contract to be performed thereunder or of any of the Contract documents which may be made between the KCAA and the tenderer, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition, or modification.

This guarantee shall remain valid and in full effect from the date of the advance payment
received by the tenderer under the Contract until *[date].*

Yours   truly,   Signature   and   seal   of   the   Guarantors
_____
[name   of   bank   or   financial   institution]
_____
[address]   _____
[date]

REPUBLIC OF KENYA

IN THE MATTER OF OATHS AND STATUTORY DECLARATION ACT

CHAPTER 15 LAWS OF KENYA

AND

IN THE MATTER OF

THE PUBLIC PROCUREMENT AND ASSET DISPOSAL ACT, 2015

I, …………………………………… holder of Identity card no……………………………………..and care of P. O. Box ………………………………… and being a resident of ……………………… in the Republic of Kenya do hereby make oath and state as follows: -

1. **THAT** I am the Chief Executive/Managing Director/Principal Officer /Director of ……………………………… (name of the Candidate) which is a Candidate in respect of Tender Number ……………………. to supply goods, render services and/or carry out works for Kenya Civil Aviation Authority and duly authorized and competent to make this Affidavit.

2. **THAT** the aforesaid Candidate has not been requested to pay any inducement to any member of the Board, Management, Staff and/or employees and/or agents of Kenya Civil Aviation Authority, which is the procuring entity.

3. **THAT** the aforesaid Candidate, its servants and/or agents have not offered any inducement to any member of the Board, Management, Staff and/or employees and/or agents of Kenya Civil Aviation Authority.

4. **THAT** the aforesaid candidate has not committed any offence under the Laws of Kenya or the Procurement Laws or been debarred from participating in any tenders by virtue of non-performance/poor-performance or any other legal reason and is not undergoing any adverse disciplinary action/claim before the Public Procurement and Disposal Authority.

5. **THAT** the aforesaid candidate, its directors and shareholders have not been convicted of corrupt or fraudulent practices in any court of competent jurisdiction within the Republic of Kenya.

6. **THAT** the aforesaid candidate has not defaulted in his/her/their/its tax obligations per the tax laws of the Republic of Kenya.

7. **THAT** the aforesaid candidate has not been in breach of the employment laws of the Republic of Kenya.

8. **THAT** what is deponed to hereinabove is true to the best of my knowledge information and belief.

SWORN at ……………………. *by the said*   }

……………………………………………..   }

Name of Chief Executive/Managing Director/   }

Principal Officer/Director   }

on this …………. day of ………….…... 2020   }

          }   _____

          }   DEPONENT

Before me   }

          }

Commissioner for Oaths   }

PRE-BID ATTENDANCE FORM

(TO BE RETURNED DULY SIGNED AND STAMPED WITH TENDER DOCUMENT)

SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF AN AIR TRAFFIC MANAGEMENT SYSTEM AT JOMO KENYATTA INTERNATIONAL AIRPORT. TENDER NUMBER KCAA/008/2019-2020.

THIS IS TO CONFIRM THAT -- (COMPANY NAME) ATTENDED A MANDATORY PRE-BID MEETING AT **KCAA HEADQUARTERS AT JKIA AIRPORT**.

COMPANY REPRESENTATIVE

NAME ---------------------------------------

DESIGNATION--------------------------------------

SIGNED --------------------------------- DATE -----------------------------------

OFFICIAL STAMP

KCAA REPRESENTATIVE

NAME ---------------------------------------

DESIGNATION--------------------------------------

SIGNED --------------------------------- DATE -----------------------------------

OFFICIAL STAMP